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# THE PRACTITIONER:

## *A JOURNAL*

OF

## THERAPEUTICS AND PUBLIC HEALTH.

EDITED BY

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# THE PRACTITIONER.

JULY, 1877.

## Original Communications.

# LIVER ABSCESS.

BY SIR J. FAYRER, K.C.S.I., M.D.

THE presence of abscess in the liver is often very obvious; the diagnosis is assured by previous history, past and present symptoms, and by the well-marked physical signs of enlargement and pointing, which leave no doubt as to what has happened. But in certain cases the diagnosis is more difficult, and they are, if I mistake not, far from infrequent, not only in hot climates, but in this country, in persons who have resided in India, China, or other hot and malarious localities, and who have returned to Europe for the recovery of health; and in whom the symptoms, though they indicate hepatic derangement and perhaps enlargement, yet are of so undecided and indefinite a character as to make it most difficult to determine whether suppuration has taken place or not. I purpose to make a few remarks on this form of hepatic abscess, as it is one of some interest and likely to come under observation here. This so-called tropical abscess of the liver, from its frequency in residents of hot or tropical countries, especially India and China, appears to be a result to which some constitutions are much more prone than others, of heat, malaria, and other climatic causes; in some instances, no doubt, of injudicious eating and drinking, though by no means always so, for it may happen in those who have observed the greatest moderation in all things. It is thought by some that liver abscess is due to dysentery, being the result of absorption of septic matter from the dysenteric ulceration in the bowel, and very probably it is so occasionally! Others have thought that liver abscess is the cause, and not the result, of the dysentery; but I am inclined to agree with those who regard them as independent, though often coexistent, and due to the same climatic causes. Liver abscess frequently occurs without dysentery, though it also very frequently occurs with it; and I quite admit that it occasionally does result secondarily from absorption from the ulcerated bowel, and is of the nature of pyæmic suppuration; in which case it is apt to be multiple, and more serious in character than the ordinary form of abscess.

I must briefly refer to the more acute form of abscess as it occurs, whether in India, or when, from any cause, it is lighted up in more temperate climates. The early symptoms of suppuration in the liver are those of congestion; swelling, pain, high temperature, the fever being preceded by chills or well-marked rigors. There is cough, pain in the right shoulder, inability to lie on the left side, owing to the weight of the swollen and dependent liver; nausea, vomiting, from pressure on the stomach, or irritation of the vagus; a yellow tinge of the skin and eyes, a high-coloured state of the urine, and lithic deposits. These symptoms are often well marked, and, together with the bulging of the side, either between or below the ribs, or in the hypochondrium, and sweating, leave no doubt of what has occurred. Such cases are not difficult of diagnosis, but there are others in which none of these symptoms are well pronounced, and yet an abscess may have formed, and escape detection, until the bulging and fluctuation are only too evident, or until sudden evacuation of its contents through the bowels, the lung, or stomach, or into the peritonæum reveals the true state of matters,—in the last case the result generally being fatal. In the former, by sudden exhaustion, amounting to collapse, accompanying a discharge of pus, which may prove fatal; or by suffocation from its effusion in the lung. Happily, however, this untoward result is the exception. The amount of pain depends much on the part of the organ implicated. If the matter be deep seated in the parenchyma, at a distance from the peritoneal covering, the pain is comparatively slight, or absent. If the mischief approach the surface, or if it have commenced there, the pain may become, or may have been from the commencement, severe. There is in any case a sense of distress and uneasiness felt most distinctly when the patient turns on his left side.

In many cases of hepatitis the patient is suffering also from malarial poisoning, and he is liable to recurrences of febrile paroxysms which render it rather difficult to decide whether the chills or rigors, that he admits he has had, are due to this or to incipient suppuration. And in some cases where there has been no positive evidence of malarial fever, the chills or rigors may have been so slight or so mixed up with other uneasy sensations as to have escaped notice, and the patient denies having had them at all.

Again, if the abscess be small and central, the pressure is so slight on surrounding parts that the stomach is neither directly nor sympathetically affected, nor is the pain felt in the right shoulder, nor the uneasiness in the left side in the recumbent posture. These signs are therefore either wanting cr so faintly expressed as to give little aid towards forming an opinion. In such cases the patients are apt to be regarded as suffering from general deterioration of health and congested liver from malarial or tropical influence, until the true nature of the case is revealed by the occurrence of the symptoms I have just described, or when, after death from diarrhœa or the exhaustion of debility, *post-mortem* examination reveals an abscess. But the termination is not always in this wise; life may be prolonged, and when death occurs from other causes it may be discovered that an encysted and quiescent abscess still exists, or that a certain amount of caseous matter in a contracted cavity shows that an abscess had formerly existed, and has undergone a process of drying up, or after years of broken health fresh inflammation may light up fresh suppuration in or around an old abscess, and prove rapidly fatal.

A few remarks on the following cases will illustrate the subject under consideration.

An Englishman, aged twenty-nine, of delicate constitution, was exposed, when on military duty, to the fierce sun of July in the north-west of India during the greater part of an afternoon. This was followed by severe headache and general malaise. A few days later he felt severe pain in the right side, was placed under treatment, and took aperients and other medicine. Three days later, on the 16th, the pain had increased, and he had fever; leeches were applied over the liver. In the evening he had a rigor. During the next few days the pain increased; he had more leeches, aperients, and salines. The acute gave place to a diffused pain and weight in the hepatic region. Blisters were then applied. A swelling made its appearance four inches from the spine below the ribs. He was then sent to Calcutta, where I saw him on the 4th September. He had been taken ill on 13th July.

He was weak and anæmic, with a yellow tinge of the skin. On examination the liver was found to be enlarged; and just below the last rib there was a prominent fluctuating swelling. Pulse 100; skin cool and moist; no pain, but uneasiness and a sense of fulness in the side; breathing slightly embarrassed. His tongue was clean and moist; bowels rather costive; appetite fair. He clearly had liver abscess, but was not suffering severely from the presence of pus.

On the following morning I opened the abscess at the most prominent point, and drew off, through a canula, eighteen ounces of thick, dark-coloured pus; the cavity was washed out with a solution of carbolic acid, ʒj. to a pint of water. The canula was left in the wound, and the cavity yielded eight ounces of pus in the evening, and was again washed out with the carbolic acid and water.

*6th.* Drew off eight ounces this morning; removed the canula, as it was causing irritation. There was no fever, and he was much relieved; the pulse less frequent. An aperient was given, as the bowels were confined. The wound was kept distended with a plug of lint soaked in glycerine and carbolic acid. Takes food, and bitter beer, with appetite. Quinine and sulphuric acid have been ordered; bowels to be kept open with Magnes. sulphas. Pulse 88; no fever.

*8th.* Doing well; the quantity of pus daily diminishing, in the morning six ounces; evening two ounces. Eats and sleeps well; remained in very good spirits.

*9th.* Continued to improve. Two ounces of pus drawn off this morning; half-an-ounce in the evening. No fever; pulse 78 to 84. Appetite good. The saline aperient to be repeated when bowels are confined.

*10th.* Half-an-ounce of pus in the morning; a quarter of an ounce in the evening. The cavity is evidently contracting; pulse 74. He looks better.

*11th.* Was fatigued by preparation for a sea-voyage. Three-quarters of an ounce of pus in the morning; about one drachm in the evening. Pulse slightly quickened. He sailed this morning for England.

A report came from Ceylon a week later, saying that he was well enough to go on shore for a walk and to amuse himself with other passengers. I find I made the following remarks on this case. This is a good example of simple abscess of the liver, resulting from the effects of climate and undue exposure to the heat, in the case of a young man of steady and regular habits. There was no history of previous dysentery or diarrhœa; it apparently commenced as usual by congestion, terminating rather insidiously, as so frequently happens, in suppuration. Pus probably commenced to form when the rigor decreased on the 24th, about twelve days after the first symptom of congestion. About this period, as inflammation approached the surface, the pain increased; this perihepatitis causing adhesion of the lower portion of the right lobe to the parietes. The abscess pointed externally, and was opened as I have mentioned.

There was every reason to believe that the abscess was solitary, and there was none that it was due to septic absorption from dysenteric ulceration. The prognosis was favourable, as latterly the abscess had been quiescent, and caused little constitutional disturbance. The rapid contraction of the cavity after evacuation of the pus evinced the rapid efforts at repair, as we may hope, by cicatrisation. The injection of the cavity by carbolic solution had a good effect, and appeared to favour the process of healing. Recovery seemed to have gone on rapidly under the influence of change of climate and sea air.

In such a case as this there was no difficulty of either diagnosis or treatment. It was an ordinary one of acute liver abscess, and presented the usual phenomena, except sickness, of which he does not appear to have complained; it pointed externally, and terminated favourably. I know nothing of his subsequent history, but I have seen others like it, where recovery was complete, and where, after returning to India, there was no recurrence of hepatic mischief.

The following case illustrates the insidious manner in which liver abscess sometimes forms.

A young Englishman, aged about twenty-one, of fair complexion and healthy, vigorous frame, probably not of very regular, though by no means intemperate, habits, after a residence of three years in Bengal, complained of anorexia, hepatic fulness, general sense of failing health, disordered bowels, sometimes confined, sometimes with diarrhœa; tongue loaded. He was anæmic, and the skin had a yellow tinge; tongue coated, pulse quickened. There had been neither rigors nor chills, cough, nausea, nor vomiting. The liver was considerably enlarged downwards; but there was no bulging between the ribs, nor was there much, if any, tenderness on pressure. He was sent away to sea for change of air. Up to this time he had never been absent from his official duties. He returned in a few days, and then went to reside a short distance out of town, continuing to perform his duties.

When I saw him some weeks later he looked pale and thin, but was in good spirits, and was at his work as usual, from which indeed he had not been absent more than a day or two. Though feeling weak, he said he was rapidly regaining strength. He informed me that one day, soon after his return from on board ship, after dinner with some friends, one of them, in romping after dinner, accidentally gave him a blow which compressed his side. This was followed immediately by symptoms of collapse, with coughing and vomiting of a large quantity—a basinful—of purulent matter.

A liver abscess had evidently opened into the stomach, and was thus evacuated. On recovering from the shock and depression he soon began to regain strength, and before very long was restored to health. The absence of pulmonary symptoms showed that the abscess did not open into the lung. The freedom from any marked symptom in this case shows how insidiously liver abscess may form. In certain cases there is not only absence of rigors, pain, high temperature, vomiting, sweating, and other symptoms, such as cough, pain in the right shoulder, but the liver may suppurate without any better marked symptoms than may be seen in ordinary cases of malarious poisoning, in which the general deterioration of health is expressed by occasional feverish attacks, attended by some hepatic congestion ; and the first evidence of the formation of matter may be the sudden evacuation of the contents of an abscess in the manner described in the preceding case. And yet on the other hand all the most characteristic indications may have been present, including rigors, chills, continuous high temperature, sweats, vomiting, shoulder pain, with hepatic swelling and pain, and the mischief subside without any proof that pus has formed. But it must be borne in mind that all these symptoms may have occurred and yet indicate nothing more than acute congestion, which has resolved, or that an abscess *may* have formed and have been removed by absorption, or may have opened into the intestine, and passed away so gradually as to be unobserved by the patient, who has regarded it as a phase of diarrhœa, from which he may already have been suffering ; in fact, the diagnosis of liver abscess is often very difficult, and may escape detection by the most acute observers.

I would briefly refer to another case. An English gentleman, aged forty-two, of slight frame, but previously in good health, who had been in India several years, returned to England suffering from symptoms of hepatic disease. The following is a brief history of his case :—

"R. B. went to India in December, 1868. Since that time has spent twenty-one months in England. Returned to India in July, 1874. Up to this time his health had been good.

"In the beginning of February, 1877, when at Mhow, he began to be ill. Pain sometimes severe on the left side of the back of the head ; his skin became rather yellow ; he was feverish, and on examination the medical man discovered that his spleen was enlarged, and the left side bulging ; this was blistered, and soon subsided. The pain in the head continued ; he lost flesh, and seemed weak and ill. He left Mhow for Bombay on the 19th of February, and remained there until the 27th of February, when he embarked for England.

"During the week in Bombay he got worse, and all the way to Port Said was very ill,—restless nights, intense weakness, loss of appetite, hands shaking much, shivering fits occasionally, and sometimes perspirations at night. After Port Said he improved a very little, but after Malta there was more improvement. He was invalided from Mhow for spleen. He did not consult any one in Bombay.

"One doctor said he looked as if he was saturated with malaria. Arrived in England on 2nd of April. He had always had excellent health in India previously, and led a most active and very temperate life. He was at Delhi for a month in December and January in tents. Very hot in the day, very cold at night. He used to be out all day, but was very careful in protecting his head from the sun. He never complained there of being ill, and it was not until a fortnight after his return to Mhow that he began to complain of the pain in the head—the commencement of this illness."

On examination here it was found that the liver was somewhat enlarged downwards, but not upwards; his skin deeply tinged with bile, his face pinched and anxious, his urine occasionally, not always, loaded with lithates, bowels rather constipated, pulse from 100 to 120 and 130, very easily excited; great debility and nervous depression, walks in a stooping attitude and looks feeble, slight tenderness on pressure over the lower margin of the liver, no pain or enlargement of the spleen; other organs apparently normal. His skin felt cool, but the themometer stood thus—the temperature was 102° to 103°; falling in the morning to 100° to 101°, but rising again in the afternoon with a regular wave.

There had been no chills, rigors, acute pain, or nausea, no pain in the shoulder, no sweats, certainly none profuse; the most that is admitted is occasional moisture of the skin in the morning after sleep. The aspect was that of one suffering from hepatic suppuration, but the prominent symptoms were wanting. I watched this case with much interest for several weeks, during which the progress was slow, but satisfactory. There was gradual return of strength, less nervous depression, improvement in the condition of the urine and secretions, and a steady, though slow, decline of temperature, from 103° to 100°—99°—98°, especially when he was under the influence of 5-grain doses of quinine; hydrochlorate of ammonia, taken three times in the day; pulse gaining more force, becoming slower and less irritable; appetite and spirits improving, and the general aspect of convalescence gradually increasing. This is one of the cases I have referred to, and it is impossible even now to say whether suppuration had taken place or not. My own belief is that a small abscess had formed, and that it had become quiescent, was gradually drying up, or that it may still some day, though convalescence has so far advanced, reveal itself through the bowels.

The value of the clinical thermometer is great in the study of such cases, and is, I think, the most reliable guide to the change that is going on in the liver. The absence of all other marked symptoms makes it exceedingly difficult to form a decided opinion, and the only thing one can do is to wait and watch the tide of daily temperature, pulse, and the state of the urinary and alvine excretions. The occasional, though far from well marked sweatings in this case tend to confirm the probability of suppuration having taken place. I believe that such cases occur, and are recovered from without suspicion that there has been more than functional derangement of the liver.

I have already mentioned the symptoms indicative of congestion and suppuration of the liver, noting how one, or several—in some cases one may say all—may be absent, or so feebly expressed as to be next to wanting; the history of the case, the presence of certain symptoms, although ill-defined—the continued depression of health and the persistence of high temperature, especially if accompanied by chills and sweating, tend to confirm the existence of suppuration, and it must be remembered that a collection of matter may become encysted as it were, be perfectly quiescent, and so localized as to have little or no apparent effect on the general health, which may to a great extent become restored—and yet such a condition be fraught with danger from a sudden accession of inflammation in the cavity or in its vicinity, and the consequent increase of the primary abscess or the development of new ones—a condition of extreme danger. Hence the importance of great care on the part of those who have suspected liver abscess; and the danger of exposure to any cause, climatic or dietetic, that might tend to light up fresh mischief.

It is well known that abscesses may form and be evacuated in one of the several ways I have mentioned, and yet perfect recovery ensue; but it is not so generally understood that a man may have an abscess in his liver, which is not thus got rid of and yet recover after its removal by absorption, or by its remaining in a state of quiescence, like chronic abscesses elsewhere, for the remainder of life; such cases are probably uncommon, but I believe they occur, and may be met with from time to time in examination of the livers of those who have died from other causes.

As to the treatment of liver abscess, it is in the outset that of active congestion with the hope of preventing suppuration. Local depletion by leeches on the side occasionally may be beneficial where the symptoms are acute, the pain great, and the fever high.

Free purgation by mercurials, salines, and ipecacuanha; hot fomentations over the liver; rest, and a mild, unstimulating diet are required in the acute stage, and are indicated so long as the acute symptoms continue, before suppuration has taken place.

When it is obvious that pus has formed, the treatment is somewhat different. The object is now to favour the evacuation of matter by such channel as may seem most favourable; to support the strength and to allay irritation. When the abscess is sufficiently near the surface to justify exploration or puncture, it should be evacuated.

The treatment is in all respects simple in its character, and without any speciality; but to enter into details would protract a paper already too long, and may be better deferred to a future occasion.

# A CASE OF TETANY.[1]

BY THOMAS BUZZARD, M.D.

An example of the peculiar affection to which this name was given by Corvisart has lately come under my observation at the National Hospital for the Paralyzed and Epileptic. So far as my personal experience goes, this disorder is not common in England, whilst, on the other hand, it would appear to happen more frequently in France than elsewhere, and to French writers, until recently, we were almost exclusively indebted for our knowledge of it. Lately, however, Riegel[2] and Erb[3] have published excellent descriptions of the affection. Its importance rests especially upon the fact that when severe and accompanied by elevation of temperature, it may chance to be mistaken for such differing conditions as spinal meningitis, acute rheumatism, or tetanus, according as the attention of the observer is attracted more especially by one or other of the symptoms.

Susan B., æt. 10, a scholar in the Hebrew School in Palestine Place, was admitted on April 5th, 1877, suffering from tonic contraction of certain muscles of both upper and lower extremities, of three weeks' duration. The right hand was somewhat swollen, the skin on the back of it being smooth and polished looking. The thumb was rigidly opposed to the forefinger, the first phalanx of which was flexed, the two last extended. The middle finger was partially, the ring and little fingers completely, flexed. (See Fig. A.) The left hand presented a precisely similar condition as regards the attitude of the fingers, but the rigidity was not quite so strongly pronounced. Any attempt to alter forcibly the position of the fingers gave rise to great pain, which was referred by the girl to the knuckles. The feet were stiffly extended and inverted, the toes being flexed. There were slow and slight choreiform movements in the hands. Over the knuckles there was a slight flush of redness, which, taken in conjunction with the swelling and pain from which the girl suffered,—there being pain even when the fingers were not touched—gave at first no little of the aspect of acute rheumatism to the condition, an idea which was at once dispelled, however, by observation of the rigid condition of the hand. The temperature was 100° Fahr., and the pulse somewhat quick.

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[1] The substance of a paper read before the Harveian Society of London.

[2] *Arch. f. Klin. Med.* xii. 1873.

[3] Ziemssen, *Cyclopædia of Practical Medicine*, English translation, vol. xi.

It was elicited that the child was one of a large family in which there were no cases of neurosis. Her intelligence appeared to be somewhat below the average.

She had enjoyed good health, and had never suffered from acute rheumatism or any ailment except measles in early life. She was well nourished, but somewhat anæmic in appearance. There was a peculiar expression about the lower part of the face, a tendency towards a constant somewhat grim smile, not amounting to, but suggestive of the sardonic grin observed in tetanus; she could move the muscles of her jaw freely enough.

It seemed that, three weeks before, on waking up in the morning, the girl found her hands in the position which I have described. She was resident at school at the time, and remained there till March 30th, when she went home to her parents. During this time her hands only were affected, and she attended her class. As however she could not grasp a book, a schoolfellow had to hold it for her. I could not glean whether the rigidity during this time was intermittent or continuous. Her parents said that when she came home her nights were restless, and she bored her head into the pillow.

When undressed and put to bed it was noted that the spinal muscles appeared weak and scarcely able to support her in a sitting posture. She was restless, throwing her head about and rubbing the occiput into the pillow. She had difficulty in holding her head erect, as it tended to fall to one side or the other, and when told to keep it still it was somewhat jerked. There was no tenderness of the spinal column on kneading it, nor during movement.

She had no headache, nor any intellectual disturbance. The only pains of which she complained were in the hands and feet. No intermission of symptoms was observed, and the muscles did not become relaxed during sleep.

On the day after her admission, April 6th, the following observations were made. A cord was tied tightly round the right forearm for a few minutes without effect upon the spasm, but with the result of causing increased pain.

The right hand was placed for five minutes in cold water without modifying the contractions, but with the effect of causing intense pain in the hand, which extended up the arm. The left hand was then placed in warm water. This caused no pain, but did not influence the contractions. I then tested, electrically, the irritability of the ext. communis digitorum and ext. carp. ulnaris, which responded normally, as far as could be judged, to the induced current; but I could obtain no response whatever, in any of the dorsal interossei muscles, to a current strengthened so as to be acutely painful. At the same time, the abductor minimi digiti answered readily. The interruption of a constant current from sixteen cells (Stöhrer) was equally inert.

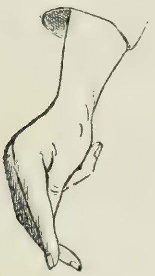

Fig. A.

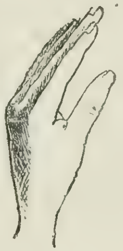

Fig. B.

She was unable, voluntarily, to extend still further a partially extended finger, nor to flex more completely one already somewhat flexed.

She had passed a very restless night. The temperature was now normal.

On the following day she had greatly improved. The hands were relaxed to a considerable extent, and there was now some slight power of flexion and extension, but accompanied by pain at the knuckles. On testing her electrically, I succeeded in exciting contractions in the interossei, but with a strength of induced current far greater than was required for the ext. dig. communis, or for the corresponding muscles on my own hand. After once getting the muscles to move, however, a smaller strength than was at first necessary succeeded in causing them to contract, but they still needed a much greater strength than did the interossei of my own hand.

Next day there was little or nothing left of contraction or pain, but the hand wore a peculiarly helpless appearance, much as though it had been for a long time confined to a splint. (See Fig. B.)

The treatment consisted in keeping the patient in bed in a private ward, and giving her light nourishment. Whether the applications of the electric current aided in removing the symptoms remains undecided. No drugs were administered. In a few days the girl was sent to the Convalescent Branch at Finchley, and when I saw her, a week since, she had had no return of the affection.

Let me note here that in reply to a question the patient said that after her hands had "got bad" one of her schoolfellows was affected in a similar manner, but only for one evening.

*Remarks.*—Trousseau, to whom we owe the first description of this affection, which attracted particular attention, relates several cases, all occurring in young adults, although he mentions besides that it is not uncommon to see the complaint in children. So frequently, however, did he find the subjects of it to be women who were nursing, that at first he styled the disease "Rheumatic contraction occurring in nurses." But in process of time he found that nursing was not the only condition favourable to its development, although, as he thought, the most frequent. Diarrhœa and the influence of cold seemed to him capable of provoking it. He describes (and all other observers whose accounts I have seen confirm his observations in this respect) paroxysms of tonic contraction lasting from a few minutes to two or three hours, and recurring in series; and he found that pressure on the arteries of the limb would reproduce the contractions when they had ceased. He found also that, in many cases, he could arrest the paroxysms in the upper extremity by making the patient dip his arms and hands into a basin of cold water. What may have happened ere I saw this girl I do not know, but during the time she was in hospital the contraction was permanent, not intermittent. I had, therefore, no opportunity of testing the effect of pressure upon the arteries. As I have noted, the influence of cold water in relaxing the contractions was *nil.* Several observers, including Benedict, Kussmaul, and Erb, have found in these cases that the irritability of the motor *nerves* is increased by electrical currents. I had not, unfortunately, the opportunity of testing this point in the case described, owing to the short duration of the girl's symptoms after her admission into the hospital. I did not observe, however, any obvious increase of irritability in the *muscles* of the forearm which responded, as I have said, to the induced current. The complete loss of irritability which I discovered in the dorsal interossei muscles is not described in any work which I have seen, and at first sight would appear to negative completely the idea that, in this case at least, there was any increase of irritability in the motor nerves supplying them. But I am disposed to think that this loss of irritability was only apparent, not real, and owed its origin to the œdema of the hand, which interfered mechanically with the application to the interossei of a current of sufficient density to excite their contraction. I have often had occasion to observe that a very moderate amount of œdema will produce this effect. It is possible, I suppose, to refer the œdema in this patient to the effect of blood-stasis from compression of the veins by the tonically contracted muscles. Whether or not there was any increased irritability of the nerves I am unable to say, but it is clear that, supposing such did exist, it would not of itself explain the phenomena of contraction. I have often discovered marked electric irritability of motor nerves of an extremity due to gouty, rheumatic, or traumatic neuritis without observing anything akin to powerful tonic contraction of the muscles supplied by them.

I am indebted to Dr. Barlow for calling my attention to the report of quite an epidemic of tetany, which was made to the Société de Biologie in Paris last November.[1] The persons attacked were girls in a school at Gentilly. Their age varied from ten to fifteen years, and twenty-four girls were reported as patients. In addition to these children there was one adult—a teacher. No diarrhœa preceded the attacks. Close to the school was an establishment for boys, none of the inmates of which were attacked. It seems, from the account given by M. Magnan, that the first case was in a girl, æt. 10. On July 15 her right hand was contracted, the fingers flexed upon the hand, the wrist slightly flexed upon the forearm. The wrist, elbow, and shoulder were painful. The attacks lasted for periods varying from half an hour to an hour, movement being possible in the intervals, but difficult. The disorder continued throughout August, September, and October, but towards the end of November she recovered.

The second case, a girl, æt. 10, was attacked on October 10 in both hands, and the third, a girl of 12, on November 7 in both feet. These two cases got rapidly well. The fourth was a girl, æt. 10, in whom both hands were attacked; and the fifth, a child of 8, who suffered from convulsive seizures of a clonic as well as tonic character. She had been much impressed with the sight of the others.

In this first series the cases had been, so to speak, isolated and scattered. But on November 13 a veritable epidemic broke out. On the same day eight cases were observed in one class alone, and on the following day eleven cases. The school was then closed, and of the nineteen cases which developed on the 13th and 14th November all speedily got well. There were no cases in the other girls' school, nor in the adjoining boys' school. People began to talk of mysterious influences upon the house, and the children were greatly impressed. The credulity of the children, the *bizarre* ideas with which they were seized, the immediate cessation of troubles when the school was closed, suggest at once that what happened was something analogous to the epidemics by imitation observed among the convulsionaires of the seventeenth and eighteenth centuries.

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[1] *Gazette des Hôpitaux*, November, 1877.

Œdema of the wrists was found in two of these cases only, the first attacked, and it was thought that these only were real, the others being imitations.

A very few words on the subject of the pathology of this disorder, about which at present we are very ignorant. If we examine the position of the hand (Fig. A) we find that the muscles which are in a state of contraction are innervated, some of them by the ulnar, and some by the median, nerve. Are we then concerned with some source of peripheral irritation of these nerve-trunks in the arm, as would be implied by the heightened excitability to electric currents which has been described by some observers? This seems to me contradicted by one important fact. It will be noted that the second finger has nearly escaped the contractile influence which causes the third and fourth to be flexed rigidly upon the palm. The same exception existed also symmetrically in the left hand. It is an everyday experience that the nearer to the periphery an influence is exerted upon a nerve-trunk, the more surely will all the muscles supplied by that trunk below this point be included in the effect of that influence, whether it be of an irritative or paralysing character. Unable therefore to refer the lesion to the nerve-trunks, we must look to some nervous centre as the source of the influence exerted in such a case as this. The continued muscular contraction—the "tetanised" state of the muscles—is due, no doubt, immediately to a series of nervous stimuli following quickly upon one another; but whether these exciting impulses proceed from the central grey matter of the cord, the cerebellum, the ganglia at the base of the brain, or the cortical grey substance of the brain, we do not know. The condition is usually referred to an exaggerated reflex excitability of the cord, but this of course is no explanation. My colleague, Dr. Hughlings Jackson, has suggested that the phenomena of tetany, like those of certain conditions of contraction in hemiplegic children, of athetosis, and some other kindred states, may perhaps be explained as a result of defective antagonism of the cerebellar influence. He believes that in health the whole of the muscles of the body are doubly innervated; innervated both by the cerebrum and cerebellum, there being a co-operation of antagonism between the two great centres. Whilst the cerebrum innervates the muscles in the order of their action from the most voluntary movements (limbs) to the most automatic (trunk), the cerebellum innervates them in the opposite order. This also is supposed to be the order of their degree of influence on parts; and is equivalent to saying that the cerebellum is the centre for continuous movements, and the cerebrum for changing movements. His speculation would be that in such a case as I have described the cerebral influence was temporarily removed; hence unimpeded cerebellar influence and rigidity of muscles, which in health the cerebrum chiefly innervates. The fact which I have mentioned, that this little girl was unable, when requested, to execute movements with her fingers, is evidence which to a certain extent goes in favour of Dr. Jackson's view. Not only could she not, for example, bring to a flexed position a stiffly-extended finger, but she was unable to flex any farther a finger already partially flexed. This inability, it appears to me, is not to be explained by a simple condition of heightened reflex excitability of the cord, but must indicate either some obstruction to the passage of pulses of nervous force from the cerebrum, or that the cerebral functioning was temporarily in abeyance. But whether a, so to speak, negative cause, the withdrawal, namely, of one kind of influence, and the consequent permission to another kind to have unlimited sway, is sufficient to account for the symptoms without the hypothesis of such a temporary pathological change as would induce of itself overaction of a particular nerve-centre, must for the present remain doubtful. In any case there is something attractive in Dr. Jackson's speculation, and we are not likely to commit the error in logic of supposing that because the assumption of the existence of a principle of antagonism helps to explain the symptoms of such a disorder as tetany, the consequent explanation proves the existence of such a principle of antagonism!

The general resemblance of tetany to conditions styled hysterical is evident, and it is quite possible that the faradisation of my patients' hands acted as a curative in the same manner as though the case had been one of hysterical trismus or aphonia.

# ON THE PREPARATION AND PROPERTIES OF THE SEPTIC EXTRACT OF MUSCLE.[1]

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## I.—INTRODUCTION.

THE experimental inquiry, of which an account is given in the following pages, was undertaken for the purpose of obtaining more precise information as to the nature and properties of the poisonous substance to which septic liquids owe their virulence.

It has been long known that the aqueous infusions of putrid animal tissues, as, for example, flesh, produce, when introduced into the circulating blood of the higher animals, certain characteristic febrile and other symptoms which are recognised as those of septic infection. These symptoms were first studied early in the present century by Gaspard, and subsequently by Magendie. In more recent times they have been made the subject of more precise and extended investigations by Panum,[2] by Otto Weber,[3] and finally by Bergmann and his pupils.[4]

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[1] Reprint of a paper recently published in the 8th Report (new series) of the Medical Officer of the Privy Council, and intitled "Report of a Further Investigation of the Properties of the Septic Ferment."

[2] P. L. Panum, Bibliothek for Läger, April 1856, pp. 253-285. Virchow's Archiv Bd. 27 (1863). Experimentelle Untersuchungen zur Physiologie und Pathologie der Embolie, Transfusion und Blutmenge, Berlin, 1864.—Virchow's Archiv Bd. 60 (1874).

[3] Otto Weber, Experimentelle Studien über Pyæmie, Septicæmie, und Fieber. Deutsche Klinik, 1864—65.

[4] Bergmann, Das putride Gift und die putride Intoxication, Dorpat, 1868.—Zur Lehre von der putriden Intoxication, Deutsche Zeitschrift für Chirurgie, Bd. I., p. 376.

The researches of Bergmann's pupils are embodied in a series of academical dissertations of the University of Dorpat, printed between the years 1866 and 1869, by Weidenbaum, von Raison, Petersenn, Schmidt, and some others.

Bergmann[1] was led by his researches to infer that the septic poison is a chemical body held in solution by the water of infusion, and accordingly undertook, in co-operation with his colleague Professor Schmiedeberg, researches with a view to its separation by chemical methods. The results of those inquiries are well known. A product was obtained which was believed to be a pure substance, and called *sepsin.* The most characteristic fact relating to it was that when its solution was introduced into the living organism, it produced a pyrexia of several hours' duration, of which the temperature curve corresponded so closely with that of the pyrexia produced by the injection of small doses of septic liquids, that the identity could not be mistaken. This curve has been since often referred to by pathological writers as the sepsin curve.

Twelve years before Bergmann wrote, the subject had been investigated by Professor Panum of Copenhagen: as however his researches were published only in Danish, they failed to exercise their due influence. Subsequently (in 1863), a short account of the work was published in Virchow's *Archiv* by the author, who further, in 1874, contributed a complete paper on the subject to the same journal. The question to which Panum's attention, particularly in his earlier researches, was chiefly directed was that of the participation of the minutest living forms in the production of the symptoms of septichæmia. "Is it the case," he inquired, "that the microscopical organisms which are always present in putrid liquids, stand in such relation with the group of symptoms which are observed when such liquids find their way into the circulating blood, or into the tissues, that these symptoms cannot present themselves, if the infecting liquid is either deprived of its organisms, or subjected to some process by which their vitality is destroyed?" This question Panum answered in the negative. Approaching the subject with a decided bias in the opposite direction, derived from the consideration of the then recent investigations of Helmholtz as to the intimate relation between the chemical process of putrefaction and the morphological changes which are associated with it, he was led, by the study of the nature and development of the symptoms themselves, to doubt whether, granting that that relation were admitted to be completely established, there was sufficient ground for applying the conceptions founded on it to the explanation of pathological actions. Thus, for example, the easily recognised fact that in septic poisoning there is no period of incubation, that the introduction of the deleterious agent into the circulation is immediately followed by the manifestations of its action, seemed altogether irreconcilable with the hypothesis that any such multiplication of virulent material as is supposed to constitute the processes of specific infection takes place in the infected organism. At the same time he fully recognised that there might be other ways in which these living particles might act morbifically, so that the possibility of their pathogenic action could not be entirely disregarded.

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[1] Bergmann und Schmiedeberg, Ueber Sepsin. Centralblatt, 1868, p. 497.

These were the considerations which led Panum to undertake his investigations. It is to be remembered that at the time that he did so, the "germ theory" had not been heard of, that no one had written about "microzymes," and that bacteria were familiar only to morphologists. He had the merit, not only of recognising clearly the importance of the pathological questions which have since become associated with these now familiar expressions, but of making a most important step in their investigation. The method he adopted was excellent. Having first carefully studied the pathological process itself so as to determine its characteristics, and to be able to recognise them with certainty, and having ascertained that they were the constant results of the introduction into the circulation of certain kinds of putrid infusions, he set to work to devise a method by which the influence of the particular factor of which the potency was in question, namely, the living organisms contained in such infusions, could be separately tested. With this view the following plan of experiment was adopted :—An infusion of flesh having been allowed to stand in a warm room for two or three weeks, was carefully filtered, then boiled for several hours, and finally evaporated to dryness on a water bath. The thoroughly dry residue was then digested first with cold and then with boiling absolute alcohol. After the alcoholic extract had been removed and set aside, the insoluble residue was extracted, first with cold then with boiling distilled water, and filtered hot. The aqueous extract, which obviously contained exclusively material insoluble in absolute alcohol, when injected into the circulation of dogs in a number of instances, produced in all the characteristic symptoms of septic infection. The following experiment may serve as an example of the rest.

The material employed was an infusion, of which 24 cub. centims. (yielding 0·071 gramme of solid residue on evaporation) produced death in six hours when injected into the venous system of a small dog. Thirty cub. centims. of aqueous extract prepared from this liquid in the way above described (of which 10·34 grammes yield 0·004 gramme of solid residue) were injected into the jugular vein of a full-grown dog. It will be sufficient to give a short summary of the symptoms, which are described in the original with great minuteness. About half an hour after the injection, the animal began to be unwell. About fifteen minutes later there were horripilation along the back, and slight twitchings of the muscles of the extremities. Soon after retchings commenced, and the ropy saliva was copiously discharged from the mouth. Then followed frequently repeated efforts to discharge fæces, the evacuations being at first natural, then accompanied with much mucus. At the end of two hours the pulse was accelerated, and the pupils were strongly dilated and the depression was already so great that the animal was unable to stand, the alvine symptoms remaining as before. After the fourth hour the dog began to improve. The following morning it was willing to take food, and was rapidly recovering. It was then killed by pithing and immediately dissected. The only pathological appearances observed were those referable to the intestine. The mucous membrane of the duodenum exhibited tracts of congestive hyperæmia, and it was so much swollen that the patches of agminate glands appeared as insular depressions.

On these facts Panum comments as follows :—" It appears to me hardly possible that any one, in face of these observations, can seriously believe that here, notwithstanding the filtration, the boiling prolonged for hours, the evaporation to dryness at the boiling temperature, the digestion with cold and boiling with absolute alcohol, the extraction with boiling water, and the final filtering, living organisms were still present, which were not destroyed;" and concludes, "that it may be regarded as a completely established fact that there exists in putrid fluid a specific chemical body which is soluble in water, and is endowed with the property when introduced into the circulating blood, of calling into existence that peculiar group of symptoms which are recognised as those of septic infection . . . retaining that power, notwithstanding that the liquid is exposed to methods of treatment of such a nature as to annihilate or destroy the vitality of whatever living organisms might previously have been present."

Notwithstanding that the terms in which these conclusions are expressed may be open to cavil, any candid person who is fairly acquainted with the discussions which have taken place during the twenty years which have elapsed since they were arrived at, will readily admit that it would have been better for pathological science if they had not been so much overlooked, for the facts on which they are based are quite irreconcilable with the often too carelessly received assumption, that the process of septic infection is dependent on the development of a living contagium.

It was not for the purpose of giving new and additional weight to the testimony of Professor Panum (as to the accuracy of which I could not entertain a moment's doubt) that I undertook the present inquiry, but chiefly in the hope that proceeding from the point to which he had attained, I might be able to advance a step further. I anticipated that whether the poisonous agent was simply a chemical product of this septic process or was endowed with organic form, I could be certain of obtaining it in a condition of great concentration by adopting a method founded on Panum's, and that I should thus be in the most favourable position for investigating its properties and physiological actions.

The question that specially interested me was that of its solubility. In my researches on contagium, published in 1870, I had arrived at the conclusion, which I think I may venture to say has now been very generally accepted, that every contagium consists ultimately of particles not soluble in water. It being admitted that the deleterious agent in septichæmia does not consist of living organisms, it appeared to me possible, and indeed for several reasons probable, that it would be found to resemble the contagia in being particulate, *i.e.* that the material, although in the ordinary sense soluble in water, might yet consist of particles so minute as to be capable of rendering the liquid in which they are suspended opalescent, and to be irremovable by any of the ordinary methods of filtration.

In order to determine this important question I filtered liquids prepared in the same way as those of Panum through porous porcelain under pressure, employing a method which will be fully described in the following pages. The result was so far in accordance with my expectations that I found that changes were produced in the liquid extract which were of such a nature as to deprive it simultaneously of its offensive smell, its poisonous action, and of its remarkable power of generating bacteria. That these three changes stood in anything more than concomitant relation to each other cannot of course be asserted; there is no sufficient ground for regarding them as attributes of one and the same substance.

Before filtration, the extract, notwithstanding that it is perfectly limpid, always exhibits under high powers of the microscope, certain sharply-defined particles. These bodies, which are of such extreme minuteness as to be only just within the limits of microscopical visibility, present no recognisable constant characters either of form or size, so that I am entirely unable to attribute to them any morphological significance. They are entirely absent in liquids which have been passed, even once, through porous porcelain.

The fact has now been proved that virulent septic liquids, even when absolutely free from bacteria or their germs, can be deprived of their virulence by filtration through porous porcelain, but the greatest caution must be used in drawing inferences from it.

The only safe form indeed in which any conclusion can be expressed on the subject is the negative. From the mode of preparation, it can scarcely be supposed that the agent is a living organism. It can further be stated that it is not an albuminous compound, for the absence of bodies of this class is proved by the chemical properties of the liquid before filtration. Its complete removal by filtration renders it probable, but by no means certain, that it is not a crystalline body, soluble in water. The only group of bodies to which its properties suggest comparison is that of the so-called "unformed ferments."

## II.—CHEMICAL, PHYSICAL, AND ORGANIC PROPERTIES OF THE EXTRACT.—EXPERIMENTAL INVESTIGATIONS.

*Preparation.*—A quantity of finely-divided fresh muscle was macerated in water for fourteen days. The liquid was then strained off and evaporated to dryness on the water bath. The residue, reduced to a fine powder, was digested for an hour or more in seven parts of cold methylated spirit, and afterwards boiled for ten minutes in the spirit. It was then collected on a filter and carefully dried at a temperature of 80° C. until it had entirely lost the alcoholic odour. The insoluble alcoholic residue thus obtained was digested for an hour in from eight to ten parts of cold distilled water, and filtered immediately before use.

*Chemical Character.*—When prepared in the above manner the liquid is nearly limpid and of a pale straw tint. It has a disagreeable odour and a slightly acid re-action. Its specific gravity is about 1,024,[1] and it yields on evaporation at 100° C. from two to two and a half per cent. of solid residue.[2] When heated it becomes slightly turbid or milky, but on the addition of a few drops of nitric acid again becomes perfectly clear. The addition of acetic acid and potassium ferrocyanide produces no reaction. Heating the extract after adding a few drops of nitric acid slightly deepens the colour, and the addition of a few drops of ammonia, after cooling, causes a deposit which, under the microscope, is seen to consist of feathery crystals, having all the characters of ammonio-magnesic phosphate. None of the other tests for albuminoid substances gave any indication of their presence.

*Organic Characters.*—The freshly-prepared liquid contains no bacteria, but a greater or less number of very minute shining spheroidal motionless bodies are constantly found in it, to the presence of which its faint opalescence is doubtless due.[1] Exposure to the air, even for a very short time, is sufficient to induce the presence of bacteria. When the extract was kept in sealed tubes, at a temperature of 38° C., bacteria developed in it with extraordinary readiness.

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[1] The specific gravity varied in different specimens from 1020·9 to 1029·7.

[2] The mean of five estimations of quantities prepared at different times was 2·1604 %.

I desire to acknowledge with gratitude the invaluable services rendered me during the whole course of this investigation by my friend and colleague Mr. Duguid, Veterinary Surgeon of the Brown Institution.—J. B. S., July, 1877.

It thus appears that the septic extract is remarkably fertile in relation to bacteria, *i.e.*, that these organisms originate in it with very great facility. In this respect it resembles those artificial cultivating liquids containing peptones which have been lately employed by Huizinga, Gscheidlen, Samuelsohn, myself, and others in experiments relating to the question of spontaneous generation. That, when freshly prepared, it is free from living organisms can scarcely be doubted, for not only does the most careful microscopical examination fail to bring any such organisms into view, but the material from which the extract is prepared has been immediately before thoroughly boiled in alcohol, a process which bacteria can scarcely be supposed capable of surviving.

In order to ascertain whether the extract, although free from living bacteria, owed its fertility to its containing particles of such minuteness as not to impair its transparency, the following experiments were made:—

*First Series.*—1. Two tubes, about four inches long, were drawn out and heated in the flame of the blow-pipe to a red heat. They were then sealed hermetically in the usual way. On cooling they were partially filled with the extract by breaking off their finely-drawn ends under the surface of the liquid, and were immediately sealed up by the blow-pipe. No. 1 was then placed in the warm chamber, at a temperature of from 35° C. to 38° C. Its contents were perfectly transparent. At the end of twenty days the liquid had become turbid, and on opening the tube the gaseous contents escaped explosively. The liquid was still slightly acid; it was very fetid, and teemed with organisms, namely, short rods, dumb-bells, and spheroids. Tube No. 2 was, previously to being placed in the warm chamber, heated to 110° C. and became slightly milky. On being opened at the same time as No. 1, there was no evolution of gas, and the liquid remained free from organisms.

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[1] See note on the next page.

*Second Series.*—Four vacuum tubes were prepared in the same manner as those used for the former experiment, and precisely the same method of filling and sealing was adopted. No. 1 was filled with freshly-prepared pyrogenic extract. No. 2 contained the extract filtered once through a porous cell.[1] No. 3 contained extract which had been filtered twice through a porous cell. In No. 4 was extract which had been passed three times through a porous cell.

These four tubes were placed in the incubator at a temperature of 38° C., and were examined on the tenth day. No. 1 exploded slightly, when its neck was broken off. The liquid was turbid, and filled with actively-moving organisms, viz., short rods, dumb-bells, spheroids, and a few short chains. No. 2 exploded but very slighly. To the naked eye its contents did not present any marked turbidity, but when examined microscopally a small number of the same kind of organisms was found as in No. 1. Tubes 3 and 4 contained no organisms.

In order to determine whether the extract, though itself free from living bacteria, possesses, even in the fresh state, the power of determining their development in other liquids, the following experiments were made by the method of impregnation.[2]

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[1] The porous cells employed for filtration are the cylindrical ones in common use for voltaic elements. The filtration is effected as follows: The liquid to be filtered is introduced into a beaker just large enough to contain the cell. Into the mouth of the cell an india-rubber cork is fitted, perforated by a glass tube. The outer end of the tube is brought into communication with a mercurial air pump by means of a flexible connector of thick-walled vulcanised india-rubber. The cell so attached is plunged into the liquid contained in the beaker, and exhausted by a few strokes of the pump, the process being repeated if necessary. In a few hours great part of the liquid will have filtered through the wall of the cells into the interior. The most perfect porous cells were selected. At first very thick cells were chosen, and the filtration was conducted through the lower part of the cell only, but it was afterwards found that by using thinner cells and repeating the process, perfect filtration could be obtained in a shorter space of time. After filtration, the specific gravity of the liquid was reduced to 1008·0 or 1009·21. It still retained its slight acid re-action, but was nearly colourless and odourless. Cells once used for filtering could be employed again after calcination. When the liquid was passed through three new porous cells in succession it was always found to be inert.

[2] This method consists in adding a drop or any liquid or substance to be tested as to its fertility, to some other so-called "cultivation liquid," in respect of which it is known that, although capable of supporting bacterial life, it is not

The cultivation liquid used was serum. In order to obtain it under conditions which would, as far as possible, preclude any accidental impregnation of it by means of organic germs, the following plan was adopted :—A glass tube, closed at one end, heated in the flame of the blow-pipe, and having its orifice plugged while cooling with cotton wool, was used for the collection of blood from the artery of a rabbit. During coagulation the plug of cotton wool was again inserted. On the following day the serum (about 8 c. c.) was collected and placed in four test tubes, which had previously been heated in the flames of a Bunsen lamp. Three of these tubes were then impregnated with a single drop of the pyrogenic extract, and their orifices were closed with cotton wool. The fourth tube was not impregnated, but the orifice was closed in the same manner as the others. The tubes were then placed vertically in a shallow dish containing a little water, covered by a bell jar, and introduced into the incubator at a temperature of 30° C.

At the end of two days the three impregnated tubes were quite turbid, while the unimpregnated one remained clear. In the former, microscopical examination revealed the presence of a great number of organisms, viz., spheroids, rods, dumb-bells, and chains. In the latter no organisms could be detected.[1]

*Physiological Action.*—In the investigation of the physiological or toxical action of the pyrogenic extract, dogs were exclusively employed, for the following reasons :—I had ascertained by preliminary experiments that in the dog the symptoms produced are remarkably constant as well as characteristic. In the smaller rodents (the only other animals at my disposal) I had found not only that the effects are inconstant, but that in these creatures

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endowed with the property of originating it. My first experiments by this method were made in 1870 with Pasteur's solution. Subsequently I used Cohn's solution, which differs from Pasteur's chiefly in the absence of cane sugar. For the present purpose serum was preferable, as being nearer in its character to the liquid under investigation.

[1] Since this paper was written my friend Mr. Dowdeswell has again investigated the septic extract with reference to its proneness to produce bacteria. He has found that my estimate of the fertility of the liquid is too high. By employing the recognized methods for the purpose he has had no difficulty in preparing a liquid, which, while exhibiting the characteristic toxical properties, yet remains sterile without filtration through porcelain and fails to fertilize cultivation liquids to which it is added. July, 1877.

the febrile process differs in respect of features more or less essential, from the same process in man; and in particular that, for reasons fully explained in my paper on fever, temperature cannot be used in them as a criterion of the intensity of the febrile disturbance.

The mode of introducing the pyrogenic extract into the circulation was as follows:—A subcutaneous vein having been exposed to the extent of about an inch, the flow of blood was arrested in it temporarily by compression with the finger, the vein wall was pierced by the cannula of a syringe for hypodermic injection, of which the capacity was 5·16 cub. cent., and the requisite quantity was injected.

If more than 5 cub. cent. were required, the syringe was disconnected and refilled without disturbing the cannula. After the injection the cutaneous incision was brought together with sutures, and always healed satisfactorily.

As the purpose of this investigation was to determine to what extent the activity of the septic extract is dependent on constituents which can be removed by mechanical means, it will be convenient first to give an account of the symptoms produced by the clear extract when prepared as above described, and repeatedly filtered in the usual way through paper, and the same liquid after it has passed through porous porcelain under pressure.

## III.—TOXICAL ACTION OF THE FILTERED EXTRACT.

The symptoms produced in dogs by the injection of pyrogenic extract were as follows:—The first symptom was shivering, more or less marked, continued for several hours, and accompanied by a rise of temperature amounting to 2° C., or even 3° C., the maximum being usually reached at the end of the third hour after the injection. Bilious vomiting and mucous diarrhœa were always observed about the time at which the temperature was highest, and continued for some time after it began to fall. In addition to the mucous diarrhœa there was frequently a considerable amount of intestinal hæmorrhage, and it was characteristic that the introduction of the thermometer into the rectum produced on each occasion tenesmus. In most cases thirst constituted a marked symptom, but if the animals were allowed to drink much water the retching and vomiting were greatly increased, and the water was brought up again almost as soon as swallowed. Usually after the end of the third hour, but never later than the end of the fourth hour after the injection, the symptoms began to subside, the temperature fell almost to the normal, and the vomiting and diarrhœa ceased. In the course of five or six hours, with the exception of an occasional slight shiver and some languor, the animal appeared to have recovered. In less than twelve hours after the injection the animals had become quite lively, and were anxious for food.

By way of example, the following case, in which a full grown and healthy animal was employed, may be given as very fairly representing the other experiments.

A healthy full-grown dog, weighing 8,264 grammes, was infected by injecting 10·32 cub. cent. of pyrogenic extract into the saphena vein in the manner already described. His temperature, previously to the injection, was 38°·7 C. The injection was completed at 4 o'clock, P.M., and immediately after, the animal became very restless, was salivated, and appeared to suffer from nausea. One hour after the injection the temperature had risen to 40°·1 C., and on withdrawing the thermometer from the rectum a small quantity of mucus was passed. The animal appeared very ill, was shivering, and at each inspiration uttered a peculiar whining moan. At 6 P.M. the temperature had increased to 40°·4 C., and now there was well marked mucous diarrhœa with tenesmus. The highest temperature, viz., 41° C. was observed at 7 P.M., all the other symptoms, but especially the shivering, being well marked. Four hours after the injection the temperature had fallen to 40°·4 C., but the other symptoms continued, and vomiting had also occurred. During the fifth hour the temperature further declined to 39°·9 C., the shivering was subsiding, the respiration had assumed a normal character, but the animal still appeared suffering. He was very dull, and refused food, stood with his back arched and tail depressed, his nose was hot and dry. On the following morning his temperature was normal, and, except that he was somewhat dull, he appeared quite recovered.

In the preceding experiment about one cub. cent. and a quarter of extract per kilo. of body weight of the animal was injected. As the symptoms were characteristic but not excessive, and the recovery was complete and prompt, this proportion was adopted in all future cases. When, however, it was necessary to employ ill-grown or ill-nourished animals, a diminution of the dose was made in consideration of these circumstances, the object being to produce the required result without exceeding it. In a long series of experiments these results were observed without fail, no case presenting itself in which there appeared to be insusceptibility to the action of the poison, and few only in which the symptoms produced were excessive.

The results of similar observations on other animals are shown in the following table, in which the date of each experiment, the weight of the animal used, the quantity injected into the circulation, the temperature of the animal before injection, and finally its temperature at successive periods of observation, one, two, three, and four hours after injection, are shown :—

TABLE I.

| No. | Date. | Weight of Dog. | Dose. | Normal. | 1st hour. | 2nd hour. | 3rd hour. | 4th hour. |
|---|---|---|---|---|---|---|---|---|
| 1 | September 1st, 1874 | 8,264 grms. | 10·32 c.c. | 38·6 | 39·1 | 40 6 | 40·2 | 39·4 |
| 2 | ,, 5th, ,, | 4,837 ,, | 5·16 ,, | 38·6 | 40·0 | 41·0 | 41·0 | 40·8 |
| 3 | ,, 28th, ,, | 8,100 ,, | 10·32 ,, | 38·8 | 40·2 | 40·6 | 41·2 | — |
| 4 | December 23rd, ,, | 4,082 ,, | 5·16 ,, | 39·0 | 39·8 | 41·2 | 40·8 | — |
| 5 | ,, 28th, ,, | 7,937 ,, | 10·32 ,, | 39·0 | 40·8 | 41·9 | 42·2 | 42·3 |
| 6 | January 5th, 1875 | 6,191 ,, | 7·56 ,, | 38·8 | 39·3 | 40·0 | 40·5 | 40·4 |
| 7 | March 19th, ,, | 6,803 ,, | 8·7 ,, | 38·6 | 39·8 | 40·2 | 40·6 | 40·4 |
| 8 | April 16th, ,, | 3,061 ,, | 4·0 ,, | 39·0 | 40 6 | 40·8 | 41·3 | 39·6 |
| 9 | ,, 21st, ,, | 6,100 ,, | 5·16 ,, | 39·0 | 41·3 | 41·2 | 40·6 | 40·4 |
| 10 | May 4th, ,, | 3,130 ,, | 5·0 ,, | 38·8 | 39·2 | 39·8 | 40·0 | 40·8 |
| 11 | June 1st, ,, | 7,257 ,, | 9·5 ,, | 38·6 | 39·4 | 40·7 | 41·4 | 40 6 |
| 12 | January 21st, 1876 | 7,937 ,, | 10·32 ,, | 38·8 | 39·6 | — | 40·8 | 40·6 |
| 13 | February 10th, ,, | 6,350 ,, | 8·0 ,, | 39·0 | 40·0 | 40·5 | 40·6 | 40·4 |
| 14 | March 20th, ,, | 5,556 ,, | 5·16 ,, | 38·8 | 40·2 | 41·0 | — | — |

In all the tabulated cases the symptoms were in strict correspondence with those already described in case No. 1. But in one or two instances, not included in the table, the symptoms which presented themselves were different. The animal passed rapidly into a state of collapse, indicated by the fact that the bodily temperature fell. The fall of temperature was accompanied by bilious vomiting, mucous diarrhœa, and intestinal hæmorrhage, and death followed in a few hours. The following case may be given in illustration :—

A healthy dog, weighing about 6,350 grammes, was injected in the tibial vein with 9 cub. cent. of the extract. Before injection the temperature of the animal was 38°·8 C., while an hour after, it had risen to 39°·6 C. and vomiting had occurred. At the end of the second hour the temperature had fallen to 38°·2 C., and the animal was in a state of collapse. There was mucous diarrhœa, and the sphincter ani was quite relaxed. The temperature gradually sank to 30°·6 C., when, at the end of the fifth hour, the animal died. During the whole period quantities of ropy saliva flowed from the mouth, and masses of mucus passed from the intestine, the breathing being laboured and very irregular. After death the mucous membrane of the intestines was found to be intensely hyperæmic, studded with hæmorrhagic patches, and covered by a layer of blood-stained mucus, which could be easily detached.

The particulars of the above and other similar instances are given in the following table:—

TABLE II.

| No. of Animal. | Date. | Weight of Dog. | Dose. | Normal Temp. | Temperature after Injection. | | | | | | Result. | Symptoms. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 hr. | 2 hrs. | 3 hrs. | 4 hrs. | 5 hrs. | 6 hrs. | | |
| | 1875 | grms. | c.c. | | | | | | | | | |
| 1 | April 12 | 6,350 | 9 | 38·8 | 39·6 | 38·2 | 37·2 | 35·6 | 32·6 | — | Death in 5 hours. | Vomiting, diarrhœa, collapse. |
| 2 | June 4 | 4,762 | 6 | 38·8 | 37·6 | 36·8 | 34·8 | 34·6 | 34·8 | — | Ditto. | Mucous diarrhœa. |
| 3 | ,, 21 | 4,989 | 5·16 | 38·8 | 39·1 | 37·2 | 39·6 | 39·4 | 39·0 | — | Recovery. | Salivation, shivering, and bilious vomiting |
| 4 | ,, 22 | 4,780 | 5·16 | 38·8 | 38·4 | 37·2 | 35·8 | — | 34·5 | 32·0 | Death in 6 hours. | Collapse. |

Among these cases the third is specially worthy of notice as intermediate in its character between the ordinary case in which the bodily temperature rises to that of pyrexia, and the more severe ones. The general symptoms were exceptionally severe, but the temperature was throughout normal. If the action of the poison had been milder, it would have risen; had it been more severe than it actually was, it would have fallen.[1] The following instance differs from the others only in the prolongation of the symptoms. The injection was effected in the afternoon: late in the evening recovery seemed probable, but did not continue.

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[1] This illustrates a statement made in my paper on the Process of Fever, viz., that in a certain sense it is possible to have fever without pyrexia. In the animal No. 3, which received the same dose of the same pyrogenic agent as the others

A dog, weighing about 3,175 grammes, had 5·16 cub. centims. of the extract injected into the tibial vein. At 3.30 P.M., before the inoculation, which was then effected, the temperature was 38°·8 C. At 4.30 it was 37°·8 C., and vomiting and mucous diarrhœa had occurred. An hour later there was marked tenesmus, and the temperature was 35°·9 C. At 6.30 the temperature was 35°·8 C., but after this a slight reaction took place, and the temperature rose a little, being 36°·2 C. at 8·30 P.M. The animal however was in a prostrate condition, and was unable to stand. The introduction of the thermometer into the rectum caused excessive straining, and protrusion of the intestine. On removing the thermometer it was seen to be covered with blood-stained mucus. The animal was found dead on the following morning. The only striking post-mortem appearance was the intense hyperæmia of the mucous membrane of the intestine, the contents of which were coloured with blood.

The two sets of cases referred to above as severe and mild respectively, differed so much in their heat phenomena that the question might arise whether the severity of the symptoms observed in certain cases was not attributable either to peculiarities in the animals used, to the mere bulk of liquid injected, or to some other cause. That the differences of effect were mainly, if not entirely, dependent on the quantity of virulent matter introduced, may be learnt by comparing the symptoms observed when the same dose of the same liquid was administered to the same animal at one time in a concentrated, at another in a diluted state. This comparison gave the following results:—

1. A strong, healthy dog, weighing 6,803 grammes, was injected with 8 cub. cent. of the ordinary extract on March 19. The normal temperature was 38°·6 C. At 5·15. P.M., one hour from the injection, it had risen to 39°·8 C., and an hour later to 40°·2 C., the rise being accompanied with shivering, vomiting,

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in which the temperature rose to febrile (104° or 106° Fahr.), the physiological process was, notwithstanding that there was no pyrexia, as truly febrile as in the others.

and diarrhœa. These symptoms were still present at 7.15, when the temperature had reached 40°·6 C. After another hour the shivering was subsiding, and the temperature had fallen to 40°·4 C. On the following day the temperature was normal, and the animal seemed quite well.

2. On April 28 the same animal was injected at 3.30 P.M. with the same quantity of liquid, the temperature being just previously 39° C. During the following three hours the temperature was successively 39°·7 C., 40°·6 C., and 40°·6 C. At 7.40 P.M. it had fallen to 40°·2 C. During the whole of this time the animal was very ill, and the usual symptoms, diarrhœa, vomiting, and shivering were present. On the following morning the animal had recovered.

3. On May 5th the same animal was again employed for experiment, and at 5.45 P.M. eight cub. cent. of a stronger extract were injected into the jugular vein. This liquid had been prepared in the same way as that used for the former experiments, but had been evaporated on the water bath at a temperature of from 80° to 85° C. to half its original volume. The normal temperature of the animal was 39° C. After injection the temperature in successive hours was as follows:—At 6.45 P.M. 37°·7 C.; at 7.45, 37°·6; at 8·45, 37°·8, and at 9.30, 37°.6 C. During the whole period the animal was shivering, had diarrhœa, and passed blood-stained mucus. At the end of the time there was marked tenesmus and extreme prostration. On the day following the injection the temperature was normal, but the animal was evidently still ill, refused food, and passed a quantity of blood, showing that the intestinal hyperæmia which is so marked a feature, had existed in its fullest intensity. On the third day there was no hæmorrhage from the bowel, but the animal was emaciating rapidly. On May 8th, at 4 P.M., it was dying, and the temperature was as low as 28° C. The specific gravity of some blood withdrawn from the carotid artery did not exceed that of serum, being only 1033·4.

The only noteworthy post-mortem appearance was the extremely pale and ex-sanguine condition of the tissues. No exudation was found in the pleura or peritoneum. The mucous membrane of the intestines was not ulcerated, but it was of a pale colour and easily detached.

## III.—ACTION OF THE EXTRACT AFTER PERCOLATION THROUGH POROUS PORCELAIN.

In the first experiment the Dog No. I. was employed, in which as before stated, the character of the symptoms produced by an ordinary dose (10 centims.) of the fresh extract had been precisely ascertained. This animal received in all four doses of the extract, of which the first, second, and fourth were filtered in the ordinary way, the third through porous porcelain. The results were as follows:—

TABLE III.

| No. of Animal. | Date. | Weight of Animal. | Quantity injected. | Extract. | Normal Temp. | Temperature after Injection. | | | | Symptoms. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 hour | 2 hours. | 3 hours. | 4 hours. | |
| | | grms. | c c. | | | | | | | |
| I. | Aug. 28, 1874 | 8·264 | 13·32 | Unfiltered | 38·7 | 40·1 | 40·4 | 41·0 | 40·4 | Shivering and vomiting. Temp. at 5th hour, 39·9. |
| | Sept. 1, 1874 | — | ,, | ,, | 38·6 | 39·1 | 40·6 | 40·2 | 39·4 | Shivering very much. |
| | ,, 9, ,, | — | | Filtered | 38·4 | 39·2 | 38·5 | 38·3 | 38·4 | No symptoms produced. |
| | ,, 14, ,, | — | ,, | Unfiltered | 38·8 | 32·9 | 41·4 | 41·5 | 40·8 | Shivering and tenesmus. Temp. at 5th hour, 40·2. |
| II. | Dec. 30, 1874 | 5·329 | 8·7 | Unfiltered | 38·8 | 39·4 | 40·5 | 41·6 | 41·2 | Vomiting and shivering. |
| | Jan. 7, 1875 | – | ,, | ,, | 38·8 | 40·0 | 40·6 | 41·4 | 41·6 | Shivering and mucous diarrhœa. |
| | ,, 14, ,, | — | ,, | ,, | 38·5 | 40·2 | 41·0 | 41·4 | 41·0 | Do. do. |
| | ,, 2, ,, | — | 8·7 | Filtered | 39·1 | 39·3 | 39·0 | 38·8 | — | No symptoms observed. |
| | ,, 11, ,, | — | ,, | ,, | 38·4 | 39·0 | 39·3 | 38·8 | 38·8 | Do. do. |
| III. | ,, 2, ,, | 4,876 | 8·7 | Unfiltered | 39·6 | 40·7 | 41·2 | 40·7 | 40·4 | Vomiting and shivering. |
| | ,, 11, ,, | — | ,, | ,, | 38·6 | 39·6 | 40·4 | 40·8 | 40·6 | Salivation, vomiting, and dysenteric evacuations. |
| | Dec. 31, 1874 | — | 8·7 | Filtered | 38·7 | 39·0 | 39·2 | 39·3 | 39·0 | No symptoms produced. |
| | Jan. 7, 1875 | — | ,, | ,, | 38·8 | 39·6 | 39·8 | 39·6 | 39·2 | Do. do. |
| | ,, 14, ,, | — | ,, | ,, | 39·0 | 39·4 | 39·8 | 40·0 | — | Do. do. |
| IV. | Feb. 19, 1876 | 7,030 | 9 | Unfiltered | 39·0 | 39·4 | 40·7 | 41·2 | 40·4 | Shivering. |
| | April 1, ,, | — | 10·32 | ,, | 39·0 | 39·4 | 40·6 | 40·3 | — | Diarrhœa and vomiting. |
| | ,, 8, ,, | - | 15·48 | ,, | 39·1 | 40·1 | 40·6 | 41·0 | — | Do. do |
| | Sept. 16, ,, | — | 9 | Filtered | 39·2 | 38·6 | 38·8 | 39·0 | — | No symptoms produced |
| | April 4, ,, | — | 15·38 | ,, | 39·2 | 39·3 | 39·2 | 39·2 | — | Do. do. |

The transitory and very inconsiderable rise of temperature which followed the third injection in Dog I. is of no significance, for it is known by observation that it is not possible to inject 10 centims. of even the most indifferent liquid without producing this slight disturbance. It is to be noticed that by the end of the second hour the temperature had returned to the standard of health, and throughout the whole period of observation the animal was in an absolutely normal condition. *It was lively, answered readily when called, and showed no indication of being in the slightest degree affected by the injection.*

The result of three similar series of experiments are exhibited in the same table. They prove in the plainest way that whatever may be the nature of the poisonous agent, it admits of complete removal by mechanical filtration. By way of supplement to this observation, two series of experiments have been recently made in which an ordinary infusion of putrid muscle was substituted for the aqueous extract of the alcoholic precipitate. I subjoin the tabular summary of these experiments in the same form as the others. They have no bearing on one of the questions discussed in the introduction to this paper, viz., that of the participation of living bacteria in the production of the toxical action; for in this case the liquid swarmed with these organisms. But they exhibit quite as clearly as the other experiments, that if the body to which a putrid infusion owes its poisonous action is soluble in water at all, it is so in such a sense that it is unable to pass through porcelain.

TABLE IV.

| No. of Animals. | Date. | Weight of Dog. | Quantity injected. | Extract. | Temperature. | | | | | Symptoms Produced. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Normal. | 1 hour. | 2 hours | 3 hours. | 4 hours. | |
| | | grms. | c c. | | | | | | | |
| 1. | March 1, 1876 | 7,030 | 8 | Unfiltered | 39·0 | 40·6 | 40·9 | 41·4 | 41·6 | Vomiting and tenesmus. |
| | ,, 17, ,, | — | 15·48 | ,, | 39·2 | 40·2 | 41·1 | 41·2 | 41·4 | Vomiting, diarrhœa, and dysenteric evacuations. |
| | ,, 16, ,, | — | ,, | Filtered. | 39·0 | 39·6 | 39·2 | 39·2 | — | No symptoms. |
| 2. | March 7, 1876 | 7,937 | 10·32 | Unfiltered | 39·0 | 39·8 | 41·0 | 41·4 | 40·8 | Bilious vomiting and diarrhœa. |
| | ,, 10, ,, | — | 10·32 | Filtered | 38·6 | 39·6 | 39·2 | 39·2 | 39·0 | No symptoms. |
| 3. | March 7, 1876 | 6,350 | 8 | Unfiltered | 39·2 | 40·2 | 39·8 | 40·2 | — | Vomiting and tenesmus. |
| | ,, 10, ,, | — | 8 | Filtered | 39·1 | 39·8 | 39·4 | 39·2 | 39·2 | No symptoms. |

# QUININE AS AN ECBOLIC.

BY JOHN PATERSON, M.D.,

*Surgeon-Superintendent "British Seamen's Hospital," Constantinople.*

A CASE occurring in my practice here seems to confirm the statement of Dr. H. P. Roberts, of Baroda,[1] as to the ecbolic action of quinine, and may be worth recording.

The patient, age twenty-four years, in good health, was near the eighth month of her first pregnancy. On the 16th March she took a haphazard dose of quinine, supposed to be about ten grains, for an imaginary threatening of fever (ague), of which she had had two or three attacks before marriage. In less than an hour after most active labour pains came on, and before I could arrive, she was delivered of a living male child, strong and healthy for his age. The membranes immediately followed. Strong uterine contractions continued for two hours, but, in every other respect, she did well.

Careful inquiry on all points relating to her health and condition leads to the conclusion that the quinine alone induced such sharp uterine action, and that it was not a feverish attack coinciding with the administration of the drug. Even admitting this to some extent, there would appear to be need of caution in the administration of quinine to pregnant women, as most practitioners in countries where ague prevails frequently observe that a large dose does, at times, produce an unusual degree of nervous irritability and uterine disturbance.

The popular notion that attributes to quinine this action is not confined to the natives in India, it is general all over the East.

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[1] *Practitioner*, April, 1877.

# Reviews.

*Atlas of Skin Diseases, consisting of a Series of Coloured Illustrations together with Descriptive Text and Notes upon Treatment.* By Tilbury Fox, M.D., F.R.C.P. London: J. & A. Churchill, 1877.

Atlases of skin diseases belong to the very limited class of publications of which we cannot have too many. The most common forms of these affections vary in the appearances they present almost *ad infinitum*, and the largest clinical experience, and an acquaintance with all the atlases published, are sometimes insufficient to determine the differential diagnosis between every-day diseases like eczema and psoriasis, so much do individual cases differ from each other. The important work issued by Messrs. Churchill under the editorship of Dr. Tilbury Fox, containing seventy-two plates, and illustrating forms of both the commoner and rarer skin diseases, is therefore a boon to the profession. The plates contain a number of the delineations of cutaneous diseases by Willan and Bateman, but more than half of them are original, and the best tribute of praise that can be offered to both the old and the new ones is that in most of them the fidelity to nature renders them, for diagnostic purposes, independent of the accompanying text. Especially worthy of study are Willan and Bateman's representations of different forms of infantile roseala, and of the impetiginous eczema of the scalp produced by pediculi in children who have a delicate skin (porrigo of these authors). Amongst the new plates we may specially direct attention to the excellence of those which illustrate the erythemata, leprosy, and diseases of the nails. The various forms of psoriasis are also well represented. The impetigo contagiosa of the editor is shown in a severe form, and whatever its nature may be the plate will enable observers to recognise it as a distinctive morbid condition of the epidermis. An instructive plate of pemphigus foliaceus shows the characteristic features of this peculiar and fatal disease.

The representations of the rarer forms of skin disease are not all equally happy. The earlier appearances in lichen ruber (or planus) are well shown in two plates (XII. & XL.), which makes it the more difficult to conceive why there should have been introduced under the same name a beautiful copy of a model of the pityriasis rubra of the French school from the museum of the St. Louis Hospital. Whether the plate of lichen scrophulosorum is or is not taken from a case of syphilis we need not discuss, but we have no hesitation in expressing our conviction that it does not represent the disease described and delineated by Hebra. The affection designated lichen scrophulosorum by the Vienna professor is not very uncommon in London. It is not shown in this atlas.

Pathologists will have much hesitation in retaining the term *impetigo rodens* as applicable to any disease attacking the face. Dr. Fox has found that the "disease bearing this designation has been a puzzle to many," and has, therefore, introduced it into his atlas. The plate to which it has been affixed (Bateman's porrigo favosa) does not possess sufficient artistic excellence to enable us to determine with certainty what disease it represents, but from Bateman's statement that it is not attended with ulceration we conclude that it is impetiginous eczema. It is not to be confounded with the pustular scrofulide of Hardy (lupus) or syphilis, with which it appears to have been mixed up under the designation impetigo rodens.

We cannot follow Dr. Fox in thinking that the case of lupus figured in Plate XLVI. is likely to excite difference of opinion amongst dermatologists as to whether it represents lupus erythematosus or lupus vulgaris. If it is compared with Dr. Duhring's Plate of lupus erythematosus, the radical distinction between these affections will be at once apparent. The representation which is introduced with the object of showing that no hard and fast line of demarcation exists between these diseases will, we fear, fail in accomplishing that result.

The disease described by Bazin as hydroa has been generally recognized by dermatologists, even of the French school, as forms of herpes of the face, lips, mucous membrane of the mouth, and herpes iris. Dr. Fox thinks this a blunder and believes that Bazin described a specific disease distinct from all these forms of herpes, and gives a figure of what he consider an exaggerated case of the affection. This is one of the points that will be better cleared up by the demonstration of cases of the alleged disease than by a plate, even when it is so well executed as the one before us.

We miss a plate of eczema marginatum as it is seen in its most common situation, and cannot understand why it has been considered advisable to represent herpes preputialis without a prepuce.

The descriptive letter-press reproduces in a condensed form the views as to pathology and treatment which characterise Dr. Fox's work on skin diseases.

*Atlas of Skin Diseases.* By Louis A. Duhring, M.D. Part I. Philadelphia: J. B. Lippincott & Co. London: 16, Southampton Street, Covent Garden.

Dr. Duhring has portrayed in this first part of his atlas typical cases of eczema (erythematosum), psoriasis, lupus erythematosus, and syphiloderma (pustulosum). The plates are of great artistic excellence, and are faithful copies of diseased appearances. The portrait of a case of lupus erythematosus deserves especial attention in England, the disease appearing to be less generally recognized with us than it is in America. Teachers as well as practitioners will find these plates useful. The work promises to be one of high merit.

1. *A System of Midwifery, including the Diseases of Pregnancy and the Puerperal State.* By William Leishman, M.D., Regius Professor of Midwifery in the University of Glasgow, &c. Second Edition. Glasgow: 1876.
2. *A Treatise on the Science and Practice of Midwifery.* By W. S. Playfair, M.D. F.R.C.P. Professor of Obstetric Medicine in King's College, &c. Two Volumes. London: 1876.
3. *A Manual of Midwifery.* By Alfred Meadows, M.D., F.R.C.P. Physician Accoucheur to St. Mary's Hopital, &c.

Obstetric literature has been recently much enriched by the issue of these works. That by Dr. Playfair, comes from the press as a perfectly new treatise, the other two being enlarged and revised editions of former publications. The first two are text-books which treat deeply of the pathology of the science; groundwork which is of the utmost importance to the student—while the last belongs to a different class, glancing but superficially at the theoretical part, and entering as fully as the size of the volume permits into the practical.

Dr. Meadow's *Manual* is not one upon which a student's knowledge of obstetrics should be based. Such works as those of Drs. Leishman and Playfair should be employed for this purpose; requiring careful reading and study, while Dr. Meadows's little book may be carried in the pocket and used to refresh the memory, or be taken up in a hurry by the busy practitioner seeking for practical information. The new edition has been considerably added to. It abounds in woodcuts, many of which might be much improved upon, others being very well executed.

Dr. Leishman's book has the advantage of being issued at a low price; instead of thirty shillings, which was charged for the original edition, the present volume is offered at a guinea, and this is a matter of no small importance to the student. Cheapness and goodness are weighty recommendations. In the present edition care has been taken to correct the errors which appeared in the first, and Dr. Leishman has shown the same honesty which he displayed at the meeting of the Obstetrical Society during the discussion on "Puerperal Fever," by acknowledging that he had held and promulgated views which he now finds to be erroneous. There are still several errors of detail; for instance, the Induction of Premature Labour is stated as having been proposed in 1556; it was not, however, till 200 years later that any conference on the subject was held. The work is a compendious one, has been carefully and elegantly written, and the drawings, speaking comparatively, are very well executed. Dr. Playfair's book deserves equally a place in the foremost ranks. It has the disadvantage of being a first edition, and we have no doubt that when a second is issued, several improvements will be made, and the inaccuracies which it contains will be rectified. These are chiefly of a typographical nature, but they are numerous. It is a pity that a work so well written should be so badly illustrated; take for example the drawing on page 339, vol. i., demonstrating expression of the placenta, and that on page 183, vol. ii., intended to show the forceps in position. It is to be hoped that such ill-executed drawings will be replaced by others. The marginal notes are valuable aids to rapid reference. The work is published in two volumes of a handy size, is well written, and contains all the improvements in modern practice. Without expressing an opinion as to which is the preferable, that of Leishman or Playfair, we would commend them equally to the student and practitioner.

*Sea-Air and Sea-Bathing, their Influence on Health.* By CHARLES PARSONS, M.D., Edin. London: J. & A. Churchill.

THIS little work is intended to be a practical guide for the use of visitors at the sea-side. At this time of the year medical men often recommend their patients to go to the seaside, and are sometimes disappointed to find that their recommendation has been productive of harm rather than good, because the bathing has been abused instead of used by their patients. The chance of such a misadventure may be lessened by this little book, which contains in a popular form an account of the physiological action of bathing and short notices of the kind of bath suitable in different diseases. There are also cautions what to avoid, as well as directions what to do, and physician as well as patient may spend a profitable hour in the perusal of the work.

# Clinic of the Month.

**Goa Powder in Skin Diseases.**—Sir Joseph Fayrer, to whom we are indebted for bringing the value of this remedy prominently into notice, refers to letters received from Dr. Da Silva Linia, Prof. Attfield, and Mr. Holmes, showing that it is the heart wood of a Leguminous tree, probably a Cæsalpina, growing in Brazil, and that it consists of 85 per cent. of chrysophanic acid. He approves of Dr. Squire's suggestion that the effects of ointments made with chrysophanic acid should be tried in those forms of disease in which the Goa or Bahia powder has been found useful. (*Medical Times and Gazette,* No. 1382.)

**Ganglion: its Treatment by Pneumatic Aspiration.**—Dr. John Broom of Clifton states that ganglion, whether in its simple or compound form, is one frequently met with by practitioners and almost as often neglected by patients. So far as his observation has gone, he has been consulted most frequently by women and children, in whom he has invariably found the disease to exist in its simple form. These patients have mostly been of rather delicate constitution and the subjects of some sudden and violent flexion of the wrist. They have sought advice rather for deformity than pain; and this has especially been the case when he has met with it in women. The custom and experience of the surgeon, as well as the age, sex, occupation, and position of the patient, usually determine one of the following methods of treatment:—applications, *e.g.* iodine liniment or tincture, or blistering solution; pad and strapping; bursting, either by digital pressure or by striking with the back of a book; incisions either direct or subcutaneous; drainage, with internal irritation, by passing a seton of thread or silk directly through it. These, separately or conjointly, have usually produced a temporary if not always a permanent cure. He gives a case of a boy about ten years of age who was brought to him, having a simple ganglion upon the sheath of the extensor indicis tendon of a few weeks' existence; he was requested to do all he could for him in one interview, as he was going into the country for some time. With this view the needle of the pneumatic aspirator was introduced and about a drachm of semitransparent fluid was drawn off, which completely emptied the sac; and then, for the purpose of preventing the refilling of the sac, and also of giving support to the weakened and dilated wall of the sheath, a small pad of lint was applied, and kept *in situ* by encircling the wrist with a single strip of soap-plaster. This dressing the patient was directed to wear for a few days, using the hand in the interim as before the operation. A few months after, it was stated by the father of the patient that it had been perfectly successful, that his son had neither weakness, pain, nor other inconvenience from it. (*British Medical Journal*, May 5, 1877.)

**Whooping Cough and Cochineal.**—Dr. Brinsley Nicholson observes that in the small and isolated colony of West Australia contagious diseases are occasionally introduced as unacknowledged imports, and when their accumulated food supply is exhausted, die out. Thus in 1868 one company of the 14th regiment was sent to Freemantle and another to Perth, and whooping cough soon after broke out. The climate being equable and warm, the population small and not overcrowded, the children sufficiently fed, and there being an absence of those dens of filth, squalor, and misery, too common in our English towns, the disease was wanting in complications, and with some exceptions tolerably mild. The treatment of those that came under his observation was at first, and partly of necessity, simple—doses of rhubarb, &c., of James's grey powder, with expectorants and anodynes of ipecacuan in various combinations. Belladonna, contrary to his expectations from its use in other disorders of the throat and wind-pipe, was found useless, and was therefore soon discarded. Having but a limited quantity of hydrocyanic acid, Dr. Nicholson kept it in reserve for any case of danger, but none such occurred to him. Such treatment, however, was unsatisfactory, having but a small and limited influence over the disease. Under these circumstances Dr. Nicholson remembered that his shrewd old hospital-serjeant had told him that two medical officers in the Royal Artillery had used a remedy which in his experience had been efficacious. This was cochineal. After questioning him again, Dr. Nicholson determined to give it a trial, though without much faith in its success. The result, however, was striking and decided. The whoop immediately lessened, or after a short time disappeared, and the course of the disease was shortened. So marked was the effect that neither error could be made nor doubt exist; and after the first trials, in which the medicine had been added to an ordinary expectorant mixture, Dr. Nicholson gave it alone in spirit and honey. The dose employed was a grain for every year of age, up to eight grains for adults (of whom he had two cases). During its administration he could observe no physiological effects. Dr. Nicholson hesitates to call this remedy an antidote, but considers that it has a most prompt effect either in directly calming the spasmodic whoop, or on the poison producing it. In the third stage of the disease it is useless. It cannot, of course, be expected that it will be of use in the complications themselves; yet he anticipates that it will, by its action on the disease, greatly prevent their occurrence, more especially those which are nervous or cerebral. (*Medical Times and Gazette,* April 21, 1877.)

**Antipyretic Treatment of Enteric Fever.**—Mr. S. Murphy, the resident medical officer to the London Fever Hospital, describes the mode in which cold bathing is carried out in the treatment of enteric fever at that hospital. They have a bath constructed on wheels, so that it can readily be brought to the patient's bed. It is six feet in length and slopes gradually from the head to the hips; the patient is in this way supported with his face above the water-level, whilst the rest of his body is completely immersed. To this bath india-rubber hoses are screwed of sufficient length to reach to an adjoining lavatory, from whence hot and cold water can be supplied, and into a sink in which it can be rapidly emptied. Patients who are especially feeble, or with weak hearts, require a temperature of 80° F., which must subsequently be reduced to 70°, or 65° if the patient stand the bath well. The majority of patients are placed in a bath of 60° to commence with. The temperature of the patient is taken in the rectum and his pulse noted immediately before immersion. He is then wrapped in a sheet and lifted into the bath. Another sheet is then stretched over the bath and the one surrounding the patient withdrawn, so that the water circulates freely round him, which is a matter of importance. His head and face are immediately sponged, and as much of his head kept under water as can be managed without the water being permitted to enter his mouth and nose. His tongue and mouth should be cleaned at the same time. In those cases in which the patient has been placed in a bath of 80° the temperature is reduced to the point required. The length of time he remains in the bath depends on the height of his temperature and that of the water. If the water be at 60°, from fifteen to twenty minutes will be sufficient; but in those cases where it is at 80° to commence with and has subsequently been reduced to 70°, half an hour's immersion is required. While the patient is in the bath, his bed is being prepared for his reception. A mackintosh is spread over the bottom sheet, and over this is a blanket. When he is removed from the bath he is, at the moment of being lifted, covered with the sheet previously stretched over it, and is then placed on the bed and wrapped in the blanket on the mackintosh, the wet sheet at this moment being withdrawn. In this manner the patient may be bathed without the least exposure of the person. He is left for half an hour in the blanket, at the end of which time it and the mackintosh are withdrawn. Occasionally a little brandy before and during the bath is given, if the patient is very weak. At the moment of immersion the patient is usually a little nervous, but even delirious patients soon cease to offer any resistance. In about ten minutes complaint begins to be made of cold, and the patient begins to shiver. During the first five minutes the temperature rises a little in the rectum, and in severe cases does not begin to fall till thirty minutes after immersion; it then falls four or five degrees. The rapidity with which the temperature falls and the length of time it remains low entirely depend on the period of the disease and its severity. The pulse, at first quickened, falls eight or ten beats per minute. If the patient is kept long in the bath, however, it rises again, but becomes diminished in volume. Usually after a quarter of an hour's immersion delirious patients recover consciousness, and in a large majority of cases quiet sleep lasting for an hour or so comes on. The subsultus diminishes, the countenance becomes clear, the expression improved, the tongue moist and cleaner, no sordes form, and the patient can take a little food. Menstruation is in nearly every case suspended by the cold bath, but no bad result has been known to follow. Lung complications are no bar to its use, the only contra-indications being hæmorrhage from the bowels and peritonitis, or collapse depending on perforation. The bath produces its fullest effect when the temperature has reached its maximum and is about to fall; that is, as a rule, between eight and twelve P.M. The general rule to be observed is to bathe the patient whenever the temperature in his axilla is 102°, or in the rectum 103°. Two or three baths a day are usually sufficient. It is seldom advisable to bathe a patient for more than fifteen minutes. For the night after the first day or two quinine may be wholly relied upon, which has a similar influence to the bath on the temperature. Thirty grains may be given in two doses of fifteen grains each with two hours interval, and given immediately after the bath. (*Lancet*, June 2, 1877.)

**Chrysarobin—a new Emetic Purge.**—Dr. J. Ashburton Thompson gives his deductions from upwards of 300 observations on the action of chrysarobin, which is another name for Goa powder, or Aroba or Bahia powder. The analysis of Prof.

Attfield gave the following composition to this powder:— Moisture, 1 per cent.; glucoside, a bitter principle or principles, and a variety of arobin, 7; chrysophanic acid, 80·84; resin-like bodies, 2; woody fibre, 5·5; and ash, ·5 per cent. The large proportion of chrysophanic acid which enters into the composition of Chrysarobin led Prof. Attfield to think that it might prove to be the active principle. Dr. Thompson found that six grains of Chrysarobin taken by himself caused, in the fourth hour after it had been taken, sensations of nausea and of disturbance of the bowels: even an abortive attempt at vomiting: then relief from all the symptoms—and sixteen hours afterwards a loose action of the bowels. Given to adults in doses of twenty grains, Dr. Thompson found that it is an emetic purge of which the action is unattended by any inconvenient symptoms, whilst its action is as certain as that of most other remedies that act in either of those ways. The action of Chrysophanic acid is similar to that of chrysarobin, though in small or moderate doses it more readily produces vomiting. It is noticeable that both senna and rhubarb contain chrysophanic acid, and he suggests that their purgative action may in part be attributed to this acid. He finds that the acid is less certain in its action than chrysarobin, and that six grains may be administered to children of ten years of age and under, and fifteen grains to adults. Observations made on the resin of chrysarobin showed that its effects were similar to those of chrysarobin itself, but considerably more powerful, vomiting and purging being usual results. The general conclusions arrived at by Dr. Thompson are as follows:—1. That chrysophanic acid is an emetic purge; that its action is as certain when given in appropriate doses as that of any other drug; that if either kind of action be wanting on account of the dose having been too small, it is the purging which will fail to appear; but that is rare. 2. That its action is favoured by its exhibition in a manner favourable to its absorption, *i.e.* by its diffusion in water, by its exhibition as a pill, and above all by its combination with a strongly alkaline fluid; that its action may be delayed by sleep and modified by a full stomach. 3. That 8 grains is an average dose, which may be advantageously given in the form of pill or powder. Lastly, that it affords a means of clearing out the prima viæ with a thoroughness and promptitude not equalled by any other medicine—a combination of tartar emetic and ipecacuanha alone excepted, whilst it is at once more certain to produce both vomiting and purging than that, and is unattended by the serious depression which is often an inseparable objection to its employment; that the power of evacuating large quantities of bile which he claims for chrysophanic acid especially fits it for the purpose named. (*British Med. Journ.* May 19, 1877.)

**Tong Pang Chong.**—Dr. J. Ivor Murray states that, twenty years ago, when Her Majesty's Colonial Consul at Hong-Kong, he accidentally became aware of a remedy with the above name known to the natives of the Malay Peninsula, and used for the cure of ringworm and some other forms of skin disease, as eczema. Some of the root submitted to Mr. Jackson, the curator of the Kew Museum, was pronounced to be the root of a Berberideous plant and nearly identical with Akebia quinata. Dr. Murray has found it most useful in tinea circinata, and in the troublesome form of eczema which attacks the inside of the thighs and perineum and the parts around the arms, and which often proves very rebellious to treatment. Mr. John Thomson of King's College has obtained a crystalline powder from it, which may prove to be chrysophanic acid, and thus account for the properties of the powder. (*British Med. Journ.* May 19, 1877.)

**Sulphurous Acid in Small-pox.** — Dr. J. Ingleby-Mackenzie states that when in charge of the Local Board Hospital of Rugby, some two years since, he was induced to try the effects of the internal administration of small doses of sulphurous acid in the treatment of small-pox. The results exceeded his expectations. It seemed to reduce the temperature, allay the pain in the lumbar regions in the earlier stages, and certainly diminish the virus of the disease. The theory of its administration was that it was an antiseptic, and that, as it had been found useful in the treatment of typhoid fever, it might play the same rôle in small-pox. (*Lancet,* June 2, 1877.)

**Natural History of Catarrhal Ophthalmia.** — Mr. Nettleship agrees with Mr. Hutchinson, in thinking that this common affection resembles the exanthems, his opinion being based on the fact that the disease is almost always symmetrical, that it attacks both eyes almost simultaneously, runs a definite course usually ending in spontaneous recovery, whilst it scarcely ever occurs twice in the same person. Mr. Nettleship, on data that he admits to be somewhat imperfect, believes that there is a slight rise of temperature in a large proportion of the cases, and that this is greater in severe cases, and at an early stage, than when the disease is mild or has lasted a relatively long time. If it be an exanthem, it is remarkable that it should affect so limited a part of the surface and be accompanied by any general feeling of illness. On the other hand, if it be merely a local affection, it is equally remarkable that it should be self-protective. His observations extended over 270 cases of the disease. The commonly received opinion of the communicability of the disease is fully borne out by inquiry. In more than one half of the cases the patient had been exposed to the liability of infection. The disease occurs at all ages, but it is most common in children. (*British Med. Journ.* June 9, 1877.)

**Treatment of Retroflexion of the Unimpregnated Uterus.**—Dr. James Braithwaite of Leeds suggests a new plan of treating this affection, which consists of dilating the canal of the uterus by means of sponge tents. Then a wire, threaded with an india-rubber ball, is so arranged as to occupy the uterus, vagina and sulcus, between the buttocks. The uterine portion of the wire, which is limited by a button on its proximal extremity, is covered by india-rubber tubing and bent so as to maintain the uterus in anteflexion. When the wire is introduced the india-rubber ball should be pushed up to the button and inflated, and the external part of the wire be so bent as to occupy the sulcus between the buttocks. The instrument cannot escape nor enter further into the uterine cavity nor get out of position. The instrument should be worn for four days, during which period the patient should remain in bed. Ergot should be administered. When the instrument is removed a Hedge's pessary should be introduced. (*Lancet*, June 2, 1877.)

**The Use of Terebene as an Antiseptic.**—Mr. Waddy of Gloucester has recently been led to investigate the utility for surgical purposes of terebene, an aromatic hydro-carbon introduced to the notice of the profession by Dr. Bond of Gloucester. Terebene he finds has a pleasant odour, and is believed when volatilising to develop ozone. When applied to any surface it exhibits remarkable adhesive properties, spreading over it in a thin film, and thus sealing it from the air, an effect which is prolonged by the slowness with which it evaporates. Lastly, it may be applied to a raw surface with impunity, and it exercises a distinctly stimulating effect on the process of cicatrisation. From the recent researches of Braidwood and Vacher on Contagium, terebene possesses germicide properties, so far as can be judged from the effect which it exhibits, in destroying the vitality of vaccine matter, when applied to heifers. Mr. Waddy has used terebene largely since the spring of 1875, both in hospital and in private practice; and he considers that it offers to the surgeon very important advantages for surgical purposes in the facts that by its aid a wound may be placed under the most favourable conditions possible for healing, and that the dressings need not be removed for weeks together, indeed not until the wound is entirely healed. In some of Mr. Waddy's cases they were thus left for three months. To illustrate the method of application which in his hands has proved successful, he gives a brief description of the dressing applied after this operation for excision of the knee-joint. Bleeding having been stopped by torsion of vessels, the wound is washed with terebene and water (an ounce to the pint), the two being well shaken together; all bone dust and blood-clot being removed, and the skin of the limb cleansed, pure terebene is poured freely over the surfaces of the wound and all crevices filled with it. The limb is placed on a common wooden back splint with foot-piece properly padded, and strips of strapping fix the thigh, leg, and foot to the splint. The edges of the wound are adapted with the fingers, and strips of lint soaked in the pure terebene are passed tightly round the limb to maintain them in apposition, plenty of terebene being poured between the surfaces of the wound. No ligatures or sutures are used. Cotton wool is applied outside the lint, enveloping the entire limb from toe to groin, and a bandage soaked in terebene outside the wool. The nurse is enjoined to keep the outside bandage soaked in terebene, a small quantity dropped two or three times daily upon it sufficing for the purpose. A wound thus dressed may be left for weeks without a bandage or pin being removed. Before removal of the dressing it should be well soaked with terebene for three or four hours. This is done by slowly dropping the terebene all over the surface of the bandage. It is then removed carefully, layer after layer being divided with the scissors, and fresh terebene being poured on to moisten any parts which have become matted together, when they easily separate. Mr. Waddy has never been troubled with any large quantity of discharge from such wounds. If the terebene be frequently applied there is no unpleasant odour. The advantages he claims for this plan are: 1. That the patient never sees the wound, he is spared the anxiety caused by the anticipation of being dressed, and the bodily shock attendant upon the removal of the dressings. 2. The wound is treated antiseptically. 3. The efforts of nature are not interfered with by accidental rough removal of dressings. 4. Perfect rest, the treatment for pain, is obtained. 5. Economy of time and labour for surgeon, assistants, and nurses, is secured.—(*British Med. Journ.* June 2, 1877.)

# Extracts from British and Foreign Journals.

**Liquid Suppositories.**—Dr. Bigelow showed before the Boston Society for Medical Improvement a syringe for the injection of liquid suppositories into the rectum. He remarked that of the common ways of introducing opiates into the system, that by cutaneous injection was the most rapid. The pain, when frequently repeated, was however to some people an objection to its use. He had also seen a case of phlegmonous erysipelas protracted for ten weeks resulting from injections into the leg. Opiates in the stomach have the disadvantage of the effect varying with the contents of the stomach. Old people, especially those suffering from diseases of the bladder, often prefer suppositories; but suppositories require time to make and to harden, and are difficult to keep in hot weather. The instrument for their introduction is clumsy and ineffectual. A liquid suppository not exceeding in bulk one or two drachms is readily introduced and quickly absorbed. A syringe for its introduction should be small, and provided with a square shoulder on the inside, so as to deliver the whole of its contents with accuracy, like a subcutaneous syringe, and should terminate in an extremity so large and blunt that it can be readily introduced. One-eighth to one-quarter of a grain of morphia requires from fifteen to forty-five minutes to be felt. (*Boston Med. and Surg. Journ.*, Feb. 22, 1877.)

**The Opening of Deep-Seated Abscesses of the Forearm.**—Dr. Parona contributes an article on this subject to the *Annali Universali di Medicina.* He says that the difficulty of treating deep-seated abscesses in the forearm, and the frequent death of the patients, are well-known facts. One of the most grave inconveniences of the methods of Nélaton and Dolbeau is that they do not provide for the complete escape of pus, and are attended with risk of wounding the artery. From a careful study of the anatomy of the parts, Dr. Parona has arrived at the conclusion that an opening may be made easily, quickly, and safely on the ulnar side of the forearm through the pronator quadratus, and the deep flexor muscles. For this purpose an incision is made parallel and slightly anterior to the ulna, commencing fourfifths of an inch above the articulating end of the bone, and passing nearly two inches upwards. The skin and subcutaneous tissue having been divided, an incision in the same direction is made in the aponeurosis, care being taken to keep the knife towards the bone rather than towards the inner margin of the flexor ulnaris. In this way the deeper part of the forearm is reached, the skin and aponeurosis only being divided, and the vessels and nerves left uninjured, and the escape of pus is rendered easy. Dr. Parona has employed this method in two cases with a rapidly successful result. (*London Medical Record,* February 15, 1877.)

**The Therapeutics of Headache.**—Professor Smith of New York divides headaches into organic and functional. A headache, he remarks, when due to nervous disturbance, such as occurs in hysterical or excitable subjects, if associated with plethora often yields to a saline cathartic. The most agreeable is the citrate of magnesia, a large dose of which should be given on an empty stomach. In addition it is well to give one of the bromides in combination with valerian. If such nervous headache be associated with anæmia, after relieving the immediate attack with the bromide and valerian, give iron after meals until there is a decided improvement in the patient's condition. In these cases it is often advisable to stimulate the heart's action. For this purpose he recommends ammonium chloride and tincture of Actæa racemosa. If there be despondency, phosphorus with nux vomica is a good preparation, one-eighth of a grain of each being made into a pill, which should be coated with sugar or gelatine. If, in addition to depression of spirits, there be sleeplessness dependent on mental anxiety, he employs the following pill:—Camphor. pulv. gr. xxv. ext. cannabis ind. gr. x. ext. hyoscyami. gr. xx. Misce. divide in pil. x. One to be taken at night, and repeat in two hours if necessary. As general rules in headache, all causes of excitement should be removed, exercise in the open air should be encouraged; the food be simple but nutritious, and the sleeping-room large and well ventilated. He recognizes two forms of sick headache, the one neuralgic in character, as hemicrania and trifacial neuralgia, the other a dyspeptic headache. In the neuralgic variety the pain in the head precedes the nausea, while in the dyspeptic variety the pain in the head succeeds the dyspeptic symptoms. In the neuralgic form vomiting does not relieve the pain, whilst in the dyspeptic an emetic or laxative often proves very beneficial by removing the cause. He has obtained good results in nervous headache from guarana, fifteen grains of which may be given every quarter of an hour, until six doses have been taken. Malarial headache should be treated with quinine, ten or fifteen grains of which may be taken two or three hours before the expected attack. If the pain continue, resort to arsenic and belladonna; five-drop doses each of Fowler's solution and tincture of belladonna after meals, increasing the arsenical solution one drop each day until œdema arsenicalis is produced. In headache from gout Professor Smith has found the following prescription beneficial:—Vin. colch. sem. ʒiii, lithii bromidi ℥ss, syr. zingib. ℥ss, aq. cinnamomi ad ℥vi. Half an ounce for a dose every four hours. Attention must be paid to the diet. The headache of syphilis is severe at night, and for its relief one-tenth of a grain of calomel may be given every hour. After continuing this for a day or two, iodide of potassium may be prescribed, as much as 350 to 400 grains per diem being sometimes required. Rheumatic headache is characterized by tenderness of the scalp, increased on pressure. It may be successfully attacked by the employment of the mild Faradaic current to the scalp, and the internal use of iodide of potassium, chloride of ammonium, and infusion of hops. In uræmic headache the judicious plan of treatment has for its object the removal of the abnormal amount of urine from the system, and one or all of the three great emunctories of the system, the kidneys, the intestines, and the skin may be called into play. Make the kidneys act if possible, apply dry cups over them, and give internally potash acetate and infusion of digitalis. The headache of acute alcoholism or inebriety follows a debauch. The first indication is to remove the alcohol from the intestinal canal. For this give of rhubarb and calcined magnesia each half a drachm; then give as follows:—Spirit ammon. aromat. ʒii, tinct. camph. ʒiss, tinct. hyoscyami. ʒiss, sp. lavand. co. ad ℥i, sig. ʒi, every hour till the headache is relieved, and then give capsicum gr. ii. and quinine gr. iii. before every meal for several days. If there be sleeplessness, give bromide of sodium and choral hydrate in combination; the former in large doses. When headache can be traced to dyspepsia an emetic of mustard or sulphate of zinc should be ordered, or a dose of rhubarb and magnesia. If the headache be frontal and the pain is located immediately over the eyes, give dilute nitro-muriatic acid in ten-drop doses well diluted after meals. If the pain is located about the roots of the hair give an alkali before meals, as twenty grains of bicarbonate of soda or magnesia. The dyspeptic headache often spreads over the entire head. In such cases he adds nux vomica, or if flatulence be a prominent symptom, bismuth. If there be constipation a pill may be given containing aloes, nux vomica, and belladonna extract. When the headache comes on soon after a meal and seems to depend on stomach digestion, half a drachm of saccharated pepsine in a glass of sherry taken during meals, will prove serviceable. Cerebral congestion as a cause of headache may be either active or passive. In the former, all excitement should be avoided. Evaporating lotions applied to the head, a saline cathartic given, and the following prescription, viz:—Sodii bromid. ʒiss, fl. extr. ergot. ʒiss, syr. zingib. ʒss, aquæ aorant. floris ad ℥iv. ♏. sig. ℥ss. every two hours. If the skin be hot and dry and the pulse full and rapid, give Fleming's tincture of aconite guttæ ii. every two hours until the heart's action is sensibly diminished. Sometimes a hot mustard foot-bath will give relief. The passive congestion variety is often found associated with cardiac disease, and most frequently with cardiac dilatation. Hypertrophy gives rise to this active variety. Improve the condition of the blood by the use of iron, quinine, bitter tonics, alcoholic stimulants, good food, and stimulate the heart's action by the use of the following:—Tinct. digitalis ʒiii, sp. ammon. aromat. ʒvi, sp. lavand. co. and syrup. simp. partes æquales ad ℥iii, ♏. sig. ʒi, every four hours. Cerebral anæmia as a cause of headache is often associated with enfeebled heart power, such as is met with in enlargement with dilatation, fatty degeneration, and myocarditis. Here the general condition of the patient must be improved, and the heart's action stimulated. Nitrite of amyl will relieve the immediate headache, and strychnia and muriate of iron may be given in a vegetable tonic. A glass of champagne as a remedy and not as a beverage may be prescribed. (*Canada Lancet,* April 1, 1877.)

**A New Stimulant—Pitury.**—Baron von Mueller writes to the *Australian Medical Journal* on the origin of the pitury, a stimulant said to be of marvellous power, and known to be in use by the Aborigines of Central Australia. After years of effort to get a specimen of the plant, he had obtained leaves, but neither flowers nor fruits. He can almost with certainty, after due microscopical examination, pronounce those of the pitury as derived from his *Duboisia Hopwoodii,* described in 1861 (Fragm. phytogr., Austral. II. 138). This bush extends from the Darling River and Barcoo to West Australia, through desert scrubs, but is of exceedingly sparse occurrence anywhere. In fixing on the origin of the pitury, a wide field for further inquiry is opened up, insomuch as a second species of *Duboisia* (*D. Myoporoides, R. Br.*), extends in forest lands from near Sydney to near Cape York, and is traced also to New Caledonia and lately to New Guinea. In all probability this (*D. Myoporoides*) shares the properties of *D. Hopwoodii,* as he finds that they both have the same burning acrid taste. Baron Mueller adds, "Though the first known species is so near to us, we never expected any such extraordinary properties in it as are now established for later discovered species. Moreover, the numerous species of the allied genus, *Anthocercis*, extending over the greater part of the Australian Continent, and to Tasmania, should now also be tasted, and further the many likewise cognate *Schwenkeas* of South America should be drawn into the same cyclus of research, nothing whatever of the properties of any of these plants being known. The natives of Central Australia chew the leaves of *Duboisia Hopwoodii*, just as the Peruvians and Chilians masticate the leaves of the coca (*Erythroxylon Coca*), to invigorate themselves during their long foot journeys through the deserts. I am not certain whether the Aborigines of all districts in which the pitury grows are really aware of its stimulating power. Those living near the Barcoo travel many days' journeys to obtain this, to them, precious foliage, which is carried always about by them broken into small fragments and tied up in little bags. It is not improbable that a new and perhaps important medicinal plant is thus gained. The blacks use the *Duboisia* to excite their courage in warfare; a large dose infuriates them." (*Nature*, May 24, 1877.)

**Potassium Nitrate in the Treatment of Scarlet Fever.**—Dr. Eisen Bockius urges that much valuable time and effort have been expended in ascertaining the province of new remedies that would better have been rewarded in extending and developing the well known qualities of an old one. He assumes that the simplest and mildest of medicinal agents, providing the effects are equal, is preferable, and that scarlatina is a zymotic disease characterised by a hyperplastic condition of the circulating fluids, the primary danger arising from the direct influence of the septic poison on the blood, lymph and chyle, the amount of danger being measured by the severity of the febrile symptoms. The secondary danger he points out is due to inflammation of the serous and mucous membranes and adenitis, which have their origin in the primary corruption of the nutritive fluids. In favour of the use of the potash salt, he indicates that of all the quasi-specific agents recommended in the zymotic fevers none is so harmless; whilst some, as carbolic acid and the sulpho-carbolates, are violent, local, and cerebro-spinal irritants. 2ndly. No antiseptic has better claims to the title of an efficient destroyer of the germs of putrefaction and arrester of fermentation, without impairing the nutrient properties of the material acted upon than the nitrate. 3rdly. All works on therapeutics agree in ascribing to this salt in an eminent degree the property of rendering the blood aplastic in the living, and maintaining its fluidity in the dead subject. It also appears to reduce the force and frequency of the pulse, and lowers the temperature of the body. Lastly, it has a powerful diuretic influence, thus acting on the gland which is so often affected in scarlet fever. Dr. Bockius has kept records of 123 cases with three deaths (all of malignant type), in which the nitrate of potash was administered, and has satisfied himself of its influence in preventing the occurrence of such sequelæ as renal and lymphatic adenitis. The dose for children under eight years of age has varied from one to five grains, repeated every second or third hour during the first day and night, and every third or fourth hour (depending on the force of the circulation) afterward, until the normal action of the heart announces the cessation of the septic irritation. The combinations in which he has used it have been ipecacuanha, opium, and spirits of nitre. Where decided evidence of weakness is present, he has prescribed quinine and iron, or if there were much emaciation, calcii phosphas, pepsina, and ol. morrhuæ in emulsion. In those instances where the anginose symptom is pronounced, he directs fat salt pork sliced thin, stitched to a flannel and sprinkled with powdered gum camphor to be applied sedulously to the throat until the impetigenous eruption it produces becomes unbearable. He uses no force in making applications to the fauces, and if he employs any it is the following, viz.:—Acid. carbolici grs. x to xx, liq. ferri subsulphat. ♏ x to xx, potass. chlorat. ʒss, aq. distillat. ℥i. In slight cases the linimentum camphoræ should be rubbed in and the throat protected by a flannel. Abundant drinks may be allowed. The temperature of the apartment should be kept up to 70° Fahr., and the air moist. No baths should be given at a lower temperature than that of the surface until the eruption has faded. Under this treatment he finds 89 per cent. of those who had no complications when he first saw them escaped all complication. (*Chicago Medical Journal and Examiner,* April, 1877.)

**The Physiological Action of Oxygenated Turpentine.**—Köhler, Professor at Halle, and Kobert, a medical student, have made a series of researches on the action of the Oleum Terebinthinæ Rectificatum of the Prussian Pharmacopœia. They find its action to be partly local and partly upon certain centres. In regard to its *local* action, it produces reddening of the surface, blistering, &c., when applied to the skin; catarrh of the conjunctiva, great desquamation of the epithelium in the stomach and intestines as well as hæmorrhagic erosion and great increase of the peristaltic action. When injected subcutaneously it produces great phlegmonous inflammation and œdema of the surrounding parts. It is also to be observed that in its passage through the animal organism it dissolves the fat most recently taken up, leading to its elimination by the kidneys in the form of a fatty acid, which crystallizes out when the urine is allowed to stand. This is especially the case in chronic turpentine poisoning. Its central action when breathed or injected into the veins in small doses as an emulsion containing one or two per cent., or when swallowed in small quantity, expresses itself: (1) In excitation of the reflex inhibitory centres of such intensity that the influence of poisons acting as excitants to these centres, as ammonium carbonate upon the brain, and strychnia upon the cord, is to a very remarkable extent paralysed. This effect is observed both in cold and warm-blooded animals. (2) It exerts an exciting influence on the vasomotor nerve centre in the medulla oblongata, which is rendered evident by a rise in the blood pressure. This again causes more rapid and energetic circulation in the periphery, singing in the ears, and other symptoms of congestion of the brain, depression of the general temperature and hypersecretion of all glands; hence follows increase in the discharge of urine, salivation, improved appetite, discharge from nose, diaphoresis, &c. (3) When given in large doses, as, for example, when a ten-per-cent. injection of turpentine emulsion is injected, or in the latter stages of slow poisoning with the drug, excitation of the inhibitory centres is no longer observable, since after the injection or complete absorption of several grammes of the oil of turpentine emulsion mammals die with minimum doses of strychnia. A paralysing influence is exerted on the vaso-motor centres, shown by a fall of the blood pressure, slower and feebler circulation in the peripheric vessels, the formation of spherical stases, rise of temperature, diminution of the secretion of the glands (and consequent bad appetite, diminution of the urinary secretion, dryness of the mucous membranes, thirst, &c.), insufficient respiration and consequent dark colour of the blood, though this still exhibits the absorption striæ of oxyhæmoglobin under the spectroscope shortly before death. Just before death, paralysis of the motor centre of the heart occurs, and of the motor centres of the intestines. The pulse, after the injection of the ten-per-cent. emulsion, first becomes very frequent, then undergoes retardation, and finally becomes imperceptible. Turpentine does not appear to act on the vagus or on the depressor nerve. The respiration, after a similar injection, becomes at first very frequent, then remarkably slow. Previous section of the vagus does not prevent the acceleration of the respiration. Neither large nor small doses of turpentine seem to have any effect on the peripheric nerves or on the striated muscles. The muscle curve of frogs poisoned with turpentine remains unchanged in character. Lastly, whilst fully attributing to oil of turpentine the power of arresting septic processes, the authors are unable to make any exact statements in regard to its power of stopping septicæmia and analogous processes in the living body. (*Centralblatt für die Med. Wissenschaften*, Feb. 24, 1877.)

**Anæmia of the Brain and its Membranes.**—Anæmia of the brain, says Dr. Peters, is relatively frequent in infancy, appearing as the result of numerous acute and chronic diseases, such as diarrhœa, gastro-enteritis, follicular enteritis, dysentery, &c., all arising from unsuitable or insufficient nourishment, and, of course, more frequent in artificially fed children. It may also result from severe typhoid fever, or in rapidly growing children, or from loss of blood. The condition was called hydrocephaloid by Marshall Hall. There are marked paleness, pinched features, wrinkled forehead, with a prominence of the frontal and temporal veins, and looseness of the skin of the head generally. The anterior fontanelle is depressed, the parietal bone overlapping the frontal. The hair is scanty and dry. There is generally great restlessness of the head, distortion of the features, picking of the hair and nose; the eyelids half open and the pupils dilated. Sleep is short and broken; the bowels are irregular; the abdomen usually distended, doughy, and tender. The bloodvessels of the meninges are thin and collapsed, and contain only a small quantity of pale blood, and clear serous fluid is often found in the subarachnoid cellular tissue. The brain is generally small and soft, and there is fatty degeneration of the neuroglia. When caused by diarrhœa and summer complaint the first indication is to check the discharges with bismuth and iron, and give small quantities of milk punch with soda, and improve the nourishment of the child at once. When softening of the brain and passive dropsy are suspected, tonic diuretics, like the muriatic tincture or ethereal tincture of the acetate of iron, are required. When cerebral anæmia occurs as a sequel of typhoid fever, children often become feeble-minded, forgetful, and appear imbecile. Fortunately these mental changes are generally transient if good food and a moderate quantity of wine, spirits, and iron be given. The aromatic spirits of ammonia, the aqua ammoniæ anisatæ are good in their place, and musk is useful. Beef-tea, pounded raw meat, and wine, administered liberally, are almost essential. Cerebral anæmia sometimes occurs in rapidly growing children between the ages of seven and ten years. It lessens their mental powers, makes their disposition peevish, produces frequent headache, giddiness, and mental hallucination, unquiet sleep, with grinding of the teeth. But quinine, iron, ale, wine, strong and easily digested food, milk punch, and residence in the country will generally produce a rapid restoration. Partial cerebral anæmia generally arises from tumours of the brain or thrombosis. Tobacco, antimony, oxide of zinc, and the bromides cause cerebral anæmia. When the diagnosis from cerebral congestion has been satisfactorily made out, alcohol must be given, but only in small doses at first. Gentian, calumba, and quassia are often required. When iron disagrees, manganese may be substituted. Hammond has given five grains of the sulphate with excellent results, but food is the most important factor in the relief of cerebral anæmia, and the recumbent position is often imperative. Small doses of opium are very useful. (*Ohio Med. and Surg. Journ.*, Vol. I., No. iv.)

**Action of Iron in Anæmia.**—G. Hayem has found from a large number of examinations that a cubic millimetre of blood drawn from the finger of a healthy person contains 5,500,000 blood corpuscles. In those suffering from saturnine anæmia the absolute number is nearly the same, in one instance, for example, being 5,352,000; but their size is altered, and they contain scarcely more than half the normal amount of hæmoglobin. Under appropriate iron treatment, the number of red corpuscles remained unchanged, or even underwent some diminution, but they regained their normal size and tint: it was necessary, however, that the treatment should be continued for some considerable period of time. In severe and incurable cases of anæmia the blood contains corpuscles of abnormal magnitude, the size of which augments with the anæmia, whilst there is also a large number of very small corpuscles. (*Comptes Rendus*, T. lxxxiii. p. 985.)

**The Local Action of Cold.**—Virginie Schlikoff has made a series of observations on man in which he introduced a thermometer into the various cavities of the body and then applied ice-bags to the exterior. He obtained the following results. 1. Measurements in the oral cavity: a delicate thermometer being placed between the cheek and the gum and an ice-bladder placed on the outside of the corresponding cheek; distinct depression of temperature was noticed in five minutes, and in the course of an hour the thermometer had fallen 5°·1 C. On removal of the ice-bag the temperature rose, and in half-an-hour had returned to the normal amount. The thicker the cheek of the subject of the experiment, the smaller was the fall. 2. Measurements in the hollow of the hand, the ice-bag being placed on the dorsum, showed that the temperature fell uniformly, and equally in equal times. The fall of temperature in seventy minutes amounted to 5°·8 C. On removal of the ice-bag the temperature rose again, but had not attained its original height after the lapse of an hour. 3. Measurements in the pleural cavity taken in two patients suffering from empyema, on whom thoracocentesis had been performed, the thermometer being placed firmly against the inner wall and the ice-bag applied to the outer in the first patient showed that the temperature fell in an hour about 3°·7 C. whilst it rose in the axilla, perhaps only accidentally 0°·2 C. The original temperature after removal of the bag was regained in fifty minutes, and the same was observed in the second patient. 4. Measurements in the intestine made in the case of a patient suffering from intestinal fistula, consequent on sphacelated hernia, showed that the thermometer fell 2°·3 C. in the course of half-an-hour, which was as long as it was judged expedient to continue the experiment. The thickness of the abdominal wall was about 4 centimetres (1½ inch). 5. Measurements taken in the vagina, the thermometer being introduced into the canal and the ice-bag placed on the lower part of the abdomen, showed that in twenty-five minutes the temperature fell from 0°·35 to 0°·8 C. Here the thickness of the abdominal walls is of great importance. 6. Measurements in a fistulous passage leading down to a piece of carious bone in the head of the tibia through inflamed and œdematous tissue showed that when the depth of the bulb was 1½ inch from the surface to which the ice-bag was applied, the temperature fell 0°·5 C. in eighty minutes. 7. The last series of experiments were undertaken with a view of determining the effects on the surface of the application of cold to the interior of the cavities of the body, and it was found that when 400 cc. of water at 8° C. were swallowed and the patient lay on the belly, the thermometer fell 2° C. on the epigastrium. The reduction in temperature lasted twenty minutes, and then began to rise, attaining its former height in twenty-five minutes. Another subject had an enema administered at a temperature of 10° C., and a thermometer was applied to the skin of the left hypochondrium. In thirty minutes the temperature was found to have fallen 3°·1 C. but it quickly rose again to its normal height. (*Deutsches Archiv f. Klin. Med.*, B. xviii. p. 576).

**Physiological Action of Copper.**—Copper has generally been regarded as possessing a highly poisonous action, and toxic effects have been attributed to the ingestion of food, especially if acid, which has been cooked or preserved for some time in vessels made of this metal. In 1875 M. Galippe published an article contesting this fact on the strength of his own experiments, and similar results have been obtained by MM. V. Burg and L. Ducom. These observers state that metallic copper and its oxides administered to dogs in the state of admixture with albuminoid, saccharine, or fatty matters do not exert any prejudicial influence on these animals, even when given in doses of two drachms per diem. It is only exceptionally that they produce vomiting and slight diarrhœa. In many instances the animals gained in weight. Small doses of the acetate such as may be found in food that has remained for twenty-four hours in a copper vessel that is not enamelled do not produce any of those violent effects in dogs that are usually attributed to them in the case of man. The soluble salts given in progressive doses rising from one to fifteen grains per diem are readily tolerated, but in 30, 45, or 60 grain doses the animals, although feeding well and remaining in apparent good health, usually vomit part of their last meal in the course of one or two hours. If the above dose be continued, however, they at length begin to loathe their food and to suffer from diarrhœa. They then rapidly become thin, and may finally die. Out of eight dogs, three died, three were killed when they had begun to fall away, and two survived and remained in perfect health. (*Archives de Physiologie,* No. 1, 1877.)

**Pilocarpine muriaticum.**—M. Bardenhewer and O. Zaubzer both corroborate the statements of Merck, who speaks favourably of the action of this preparation injected subcutaneously in doses of one-third of a grain, and observes that it possesses the specific action of Jaborandi without its secondary unpleasant effects. (*Berlin Klin. Wochens,* 1877, No. 1, and *Bayer Aerzt. Int. Blatt,* 1877, No. 8.)

**A Means of Arresting Hooping Cough.**—Lasinski recommends the insufflation into the larynx of the patient of a small quantity of a powder composed of 30 grains of salicylic acid, 15 grains of quinine, 7 grains of bicarbonate of soda, and 7 grains of sugar. This should be done twice daily, and the above quantity should last about ten days. He adopted this treatment in fifteen cases of severe hooping cough, and all were cured in periods varying from eight to thirty days. (*Deutsch. Med. Wochens.* No. 2, 1877.)

**Faradisation in Polyarthritis Rheumatica.**—M. F. Beetz. Joints affected with rheumatism bear an induction current of tolerable strength without pain, providing they are not covered with thick masses of muscle, like the hip and shoulder. The currents should be continued for five minutes, when the pain will be found to have diminished and the mobility of the joint to have increased. The *rationale* of the effect seems to be the constriction and subsequent expansion of the cutaneous vessels, as well as the relief of pain, but it is questionable whether it diminishes fever. (*Deutsch. Archiv. f. Klin. Med.* B. xviii. p. 482.)

## Department of Public Health.

# A REPLY TO AN ADDRESS OF PROF. MAX VON PETTENKOFER OF MUNICH,

*Entitled, "Nine Propositions bearing on the Ætiology and Prophylaxis of Cholera, deduced from the Official Reports of the Cholera Epidemic in East India and North America."*

BY ELY MACCLELLAN, M.D.,

*Surgeon, United States Army.*

In the February and March numbers of the *Practitioner* of this year, Dr. Max von Pettenkofer, Professor of Hygiene in the University of Munich, has done me the honour of devoting many pages to a review of that portion of the Report on the Cholera Epidemic of 1873 in the United States for which I am responsible.

In this review Dr. von Pettenkofer has cast his gauntlet of iron into the lists, and although it cannot be said that his challenge is couched in the courteous language of a truly gallant knight, the hero of many a well-fought field, I lift his glove and accept his rude challenge.

It is all the more necessary that a reply should be made to his elaborate review, from the fact that Dr. von Pettenkofer is evidently labouring under some strange misapprehension as regards my report, and it is certainly but right that he should be corrected; but the act of correction is never a pleasing task, especially when it must be exercised towards one who once occupied so exalted a position in the scientific world.

I do not propose in this paper to enter into the discussion of any points which do not directly relate to my own work; but a strange error into which Dr. von Pettenkofer has fallen, and with which he opens his review, must be alluded to. My friend Dr. J. M. Woodworth holds no position at Washington which is at all parallel with that of Dr. Cunningham at Calcutta. In the investigation from which grew the volume in question, each had his specific duties to perform.

If Dr. von Pettenkofer will do me the honour to consult the files of the American *Practitioner*—a most respectable medical journal, copies of which are regularly sent abroad, he will find that in the February and March, 1874, numbers of that journal, I discussed the Etiology of Cholera under a series of seven propositions. As these propositions antedate the nine propositions of Dr. Woodworth by more than a year, Dr. von Pettenkofer will doubtless comprehend that his very laboured attempt to connect the two series to suit his view of the case completely fails.

Dr. von Pettenkofer is evidently exercised over some points in the introductory pages of my report, which it seems he cannot comprehend. He writes, "It will not be without interest if we make a few observations upon the history of the production of this extensive work." This sentence is followed by an *exposé,* which was doubtless intended to cover me with shame and confusion. The *rationale* of his remarks is simply this: Cunningham, the sanitary commissioner with the government for India, and a staff of trained assistants, has been twelve long years in arriving at a series of nine propositions; whilst here comes one, who, after an investigation of but two hundred and thirty-eight days, presumes to advance a series of seven propositions.

Oh! those two hundred and thirty-eight days! How the changes have been rung upon them! It is almost too bad to disabuse the mind of Dr. von Pettenkofer, to deprive him of his creation, but it must be done.

I am not possessed of sufficient egotism to suppose that my name ever arrested the eye of Dr. von Pettenkofer until he found it upon the title-page of the American Report on the Cholera of 1873, but I can assure him that great and overpowering as is the influence of his name, he would have difficulty in persuading a jury of American epidemiologists that my experience in cholera research was limited to the two hundred and thirty-eight days upon which he lays so much stress; and it is but right that I should inform him that the knowledge which I brought to the work had been gained from personal contact with the disease; among troops and civilians, in barracks, in the field, in almshouses, prisons, and penitentiaries, and not in bureau work, where, sitting in a soft-cushioned chair, I could gloss the reports of men upon whom I had officially forced my opinion. I would also assure the learned doctor that whenever I am called to "the judgment seat of scientific criticism," I am prepared to answer, "*Adsum.*"

Even in small things Dr. von Pettenkofer cannot bring himself to accurate statements, for I find on page 152, line six, that he states, "It (the report) was printed on the 13th of January, 1875;" and again upon lines eight, nine, and ten, he writes, "No time was lost in the preparation of the report; but much delay appears to have taken place in the printing, since the report was not issued till the spring of 1876."

Again, on page 152 of the review, he would lead his readers to suppose that a series of congratulatory orders must have been issued, in fact that early in January, 1875, a jubilee must have taken place at Washington, with Dr. Woodworth and myself as the central figures. This is simply a gratuitous assumption on his part, an assumption grossly at variance with fact; for not one word exists indicating that anything took place, except the official transfer of a paper from one government office to another.

Upon page 155, Dr. von Pettenkofer fully prepares me to meet again my aërial Bengal reviewer, and I was not surprised to find that the gist of the article in the Indian Annals of Medical Science for January, 1876, had been accurately reproduced. As I have already devoted considerable space[1] to said review, it is unnecessary further to allude to it, except that I would note the fidelity with which Dr. Von Pettenkofer has followed the clue therein furnished him; for he has evidently devoted more study to that article than he has to the whole of the work he is attempting to review.

It is very true that, from the Bavarian and Bengal standpoint,

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[1] *Richmond and Louisville Medical Journal* for December, 1876.

I did omit "the finest opportunity for instituting profound investigations;" but really I could see no good reason for throwing away any of my precious time in such mole-like investigations, when I had a broad fresh trail to travel over, on which I was cheered by the voluntary contributions of 751 medical men (whose names and addresses were spread out before Dr. von Pettenkofer, if he really opened the pages of the book), who furnished me with the results of their investigations during the epidemic, and with detailed facts in the history of 7,356 cases,[1] which occurred under their observation.

Before proceeding to the most important portions of his paper, I desire to state that for once Dr. von Pettenkofer fully meets my individual views when, on page 189, he expresses the sharply defined features of the two opposing theories in the etiology of cholera.

I. The theory of its local origin.

II. The theory of its diffusion through the agency of human beings.

I most cordially join him in the expression "that the time appears to have arrived when the weaker of the two theories must yield to the other. It is necessary that a decided view on the subject should be taken, since the subject is one that affects all mankind."

For that reason, in season and out of season, I have dared to raise my voice. For that reason I shall continue in the work, though it may subject me to the ridicule of Dr. von Pettenkofer and his coadjutors. Because the practical theory that cholera is diffused throughout the world by human agency is proved by so vast an accumulation of facts, that it must be accepted as true, and the time is near at hand when theorists who have sacrificed hecatombs of human lives by their blind obstinacy or selfish persistency will be compelled to bow to the truth.

In the review in question, Dr. von Pettenkofer proceeds to discuss, seriatim, the seven propositions which I presented in Chapter II. of my report. It will however be unnecessary to follow out his entire line of argument, since after all has been said, it is simply the conflict between the two theories, supported by those styled the "localists" and the "contagionists." But the learned doctor uses as illustrations certain incidents (to which in my report I did attach weight, and which I still consider as invaluable), to the utter exclusion of many other facts which are equally important from a practical standpoint; therefore in my answer I shall confine myself, so far as it is possible, to the various incidents narrated in the History of the Cholera Epidemic of 1873 in the United States.

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[1] These lists of cases have been placed upon record in the library of the Surgeon-General's Office at Washington, D.C.

Von Pettenkofer seems to have abandoned many of his former views, and to have thrown his weight almost entirely in favour of the opinions held in Bengal. Formerly he admitted that persons and things could infect localities with cholera, but taught that the influence of the infected locality in infecting other persons and things was greater than the individual influence. Heretofore he has maintained that outbreaks of cholera depended upon *three factors*. I. The intercourse. II. The local or temporary disposition. III. The individual disposition; and this is nothing more than is claimed by the advocates of the "practical theory." In the past, he has most distinctly recorded his belief in "cholera germs," and of the power which they have of attaching themselves to objects, and he has only opposed "the practical theory," when he insisted that human intercourse was not the only condition which effected the diffusion of cholera; but that sub-soil, water, and general drainage systems are important factors.

Before proceeding to discuss the evidence presented by the American epidemic of 1873, in favour of the diffusion of cholera by human agency, I beg that I may be pardoned for intruding upon Dr. von Pettenkofer's notice a brief mention of some personal cholera experience.

In 1866 I was a firm advocate (theoretically) of what is now known as the localistic theory, and I was influenced in great measure by the theory then taught by Von Pettenkofer; but when I came to put this theory to a practical test, it failed me, and I was led beyond its narrow limits. I was at that time on duty at a military post upon a small island at the mouth of the Delaware river, in midstream, equidistant one and a half mile from the shores of New Jersey and Delaware.

This island, known as the Pea Patch, is a low mud-bank having an area of eighty acres, with an average level of three feet above low-water mark. It is surrounded by an embankment faced with broken stone, which is ten feet above low-water mark, and is drained by means of a net-work of ditches, through which the tide, which has an average rise of seven feet, is permitted to ebb and flow, controlled by two flood-gates. The ditches vary from three to thirty feet in width, and are in depth from eight inches below, to one foot above mean low-water mark.

The water-supply is derived from rain-fall.

The water-closets and drains within the fortifications empty into the moat.

The location of this island, at the junction of fresh and salt water, surrounded by mudbanks, which are uncovered at each ebb of the tide, and exposed to the miasm of swamp lands which line the river banks, is most favourable to the development of malarial diseases.

During the late civil war the Pea Patch island was converted into a depôt for Confederate prisoners of war, of whom from 1862 to 1865 the total number was 31,810 individuals, exclusive of the necessary guards and attendants.

One portion of the small area of the island was used as a burial-ground, and about 150 bodies were therein buried before the removal of all the dead to the mainland was ordered.

Although privies were built upon the banks of the island, and all refuse matter was supposed to have been emptied into the river, still the ditches within the sea-wall became contaminated with human excrement and other organic matter, and the soil was saturated with the same; but during the four years of occupancy only 1464 deaths occurred from miasmatic causes.

Surely here was a sufficient combination of factors to induce cholera. A vast crowd of human beings confined to a restricted space, and that the concave surface of a mud-bank—the intense heat of summer causing a rapid decomposition of animal and vegetable matter—impure water,[1] and often badly-prepared food; yet no disease even simulating cholera occurred.

The steady advance of cholera throughout Europe in 1865, and the probability that the disease would cross the Atlantic at no distant date, led early in the spring of 1866 to a thorough cleansing and policing of the island. The wooden structures which had been occupied by the prisoners were removed; the ditches were drained and cleansed; and the burial lot was covered with quick-lime and fresh earth to the depth of four feet.

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[1] It is true that within the fortifications the rain-water received from the terreplein passes through filters before it reaches the great cisterns below the walls;

This work had scarcely been completed when the arrival of cholera in New York Harbour was announced. Upon the development of the disease in the small towns upon the Delaware River, a *cordon de santé* was established, and no communication was permitted between the island and the mainland, except by a boat's crew, of whom but one man was permitted to go on shore to obtain the mail. The post having been provisioned for several months, there was no necessity for drawing supplies from the mainland.[1]

Delaware City, the nearest mail station to Fort Delaware, suffered severely. Of a population of 1,500 inhabitants thirty odd cholera deaths occurred during the month of August.[2] As a medical man, my services were constantly demanded for consultation in cases upon the mainland, and the cordon was relaxed as regards myself; but having learned from my study of Pettenkofer's writings that cholera germs could attach themselves to objects, I adopted the precaution of changing my clothing at an isolated shed whenever I left and returned to the island. I had made many such visits, and had seen many cases in which I was unable to trace the medium of infection, when I began to think that all precautions against conveying the disease were useless, and on the 9th of September, late in the evening, I returned to the island (after having spent the day at the bedside of a cholera case) and proceeded to my quarters, without taking the precaution of changing my clothing. In the room of my wife, who was at the time an invalid, these clothes remained all night, and two days later she had cholera, from which she barely escaped with her life. No other cases of the disease occurred upon the island.

but it is not so as regards the cisterns outside the fort. The latter are open, and receive rain-water from the roofs of the buildings, with all the impurities which it may wash from the atmosphere.

[1] Circular No. 5, War Department, Surgeon-General's Office, 1867, pp. 14-61.

[2] *Ibid.* p. 60.

At this time the mean strength of the command was 172 men, in addition to whom there were the families of officers, and of married soldiers, as well as a detachment of engineer workmen, the majority of whom had families, the inhabitants of the island amounting to about 250 individuals.

In the garrison, during the months of July, August, and September, there occurred some forty odd cases of miasmatic diseases, but no cholera.

It is more than probable that in this instance the garrison of Fort Delaware was preserved from epidemic cholera by the *cordon de santé* which rigidly excluded all persons coming from the mainland; for all the towns in the vicinity of the post, both in New Jersey and Delaware, were infected by the disease, and it is equally probable that I did carry the germs of the disease in my clothing from Delaware City into my own quarters upon the island; and that no other cases occurred is as probably due to the active system of disinfection with mineral acids, which I adopted, having learned it from Pettenkofer.

In June and July, 1867, it was my fortune to witness the diffusion of cholera throughout the State of Kansas,[1] by the movements of troops and government employés. I was at the time attached to a regiment of infantry, moving over those high, dry, and almost uninhabited plains, which are represented upon old maps as the Great American Desert. In this command, which had become cholera-infected at Fort Stacker, although it was kept constantly moving (making its daily march, for the experience of American army medical officers differs in this, as it does with the majority of Dr. Bryden's conclusions), and although all travelled routes were avoided and a new trail established, and although water was taken only from a swift flowing river, still the disease did not subside until about the 20th of August.[2]

Early in the spring of 1867 an Indian war occurred in the State of Kansas, during which the Cheyennes, Arapahoe, and Kiowa Indians made vigorous stand against the troops; but no sooner had cholera broken out at the various posts and among the troops in the field, than the Indians withdrew, and were no more seen during the summer, although in the autumn of the same year hostilities were renewed, and were continued during the succeeding year. It was evident that the Indians, from their points of observation, discovered that an unusual number of deaths was occurring among the troops, and having had experience in the past that the soldiers occasionally had diseases among them that were more to be dreaded than their weapons (for these Indians had been in previous years infected with cholera, and had suffered most severely from it), they prudently took themselves out of harm's way. Neither the views of Professor von Pettenkofer, nor the reports of the Bengal Sanitary Officer had reached these tribes; but they were simple, yet wise, enough to act upon their former experience.

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[1] Circular No. 1, War Department, Surgeon-General's Office, June 10, 1868, p. 8.

[2] *Ibid.* pp. 41-46.

I am informed by Assistant-Surgeon Dr. Graw of the army, who also has had an experience of several years' service in the heart of the country inhabited by the Indians above-mentioned, that it is an invariable custom for the Indians to abandon at once any individual who may be taken with cholera or smallpox, so well convinced were they that they can contract these diseases from infected individuals.

I was also engaged for some months in the observation and study of the epidemic of cholera in Kentucky in 1873.

After this introduction I will ask the attention of Dr. von Pettenkofer to some of the facts collected during the investigation of the cholera epidemic of 1873 in the United States, which he seems to have overlooked, but which strongly support the theory of the diffusion of epidemic cholera by human intercourse.

As yet no positive evidence has been found that Asiatic cholera was carried into the city of New Orleans in 1873, but the circumstantial evidence is very strong that the disease was imported among the effects of emigrants from abroad. It is true that none of the early or later reported cases of the disease in that city occurred in the persons of emigrants, but it is shown upon page 110 of my report that such persons rarely made much delay in the city of New Orleans, but that as rapidly as possible they set out for the interior.

All the early cases of cholera in the city of New Orleans in

1873 had their origin at a common centre, and that centre was the levee assigned to ships and steam-vessels. Facing this levee are the lodging-houses frequented by emigrants and sailors.[1] Emigrants from European districts which in 1870, 1871, and 1872 had been infected with cholera, and also from the West Indian Islands, which had been subjected to the same infection,[2] arrived at New Orleans prior to the epidemic outbreak in that city.

The emigrants were from Germany, Austria, France, Ireland, Great Britain, Italy, Spain, Sweden, Russia, Belgium, Holland, Switzerland, and the West Indies. That cholera had prevailed in some of these localities in 1872 cannot be denied, and it is a matter of record that vessels infected with the disease had arrived at West Indian and South American ports, in proof of which Dr. von Pettenkofer is referred to p. 111 of the *Cholera Report* and to pp. 362-366 of Macnamara's *History of Asiatic Cholera.*

It can probably never be determined whether any of the vessels that arrived at the port of New Orleans in 1873 were infected by the occurrence of cholera cases upon them or not. In the Report of the President of the Louisiana State Board of Health, upon the authority of the Resident Physician of the Mississippi Quarantine Station, it is stated that no vessel had arrived upon which there had been cholera in any form. But this statement cannot be accepted, for it is shown by a subsequent report of the same Board of Health that the officer upon whose authority this announcement was made was on November 20, 1873, removed, because " of disobedience to positive instructions of the Board directing disinfection of vessels from infected ports." The next year this objectionable individual was reinstated through political influence, and was again discharged for having passed a yellow fever vessel to the city. How could he have been so reliable as regards cholera and so unreliable as regards yellow fever?

It is also a point worthy of notice that I was unable to obtain from him any lists of sickness or of deaths which had occurred at sea, upon any of the arriving vessels.

The New Orleans outbreak was by no means a severe one.

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[1] *Cholera Report*, Map, p. 104.

[2] *Ibid.* pp. 75, 90, 107 and 109.

The disease lingered from February to November, 1873, with a total of only 259 fatal cases, but with a very unusually large number of cases of diarrhœa. The greatest mortality was in the month of May, when 125 deaths were reported. This mortality occurred in a population of over 200,000 inhabitants, of whom nearly 50,000 were foreigners, and over 50,000 were negroes. Of the foreign population a large percentage are of the lower classes of Southern Europe (especially Italy), who reside in crowded and filthy tenements. Of the negro population, a majority equal, if they do not excel, the "Diego" population in this mode of life. The disease during the outbreak of 1873 was confined almost exclusively to the lower classes of the inhabitants.

In vol. i. *Report of the American Public Health Association* will be found (p. 189) a map illustrative of a paper read before the Association at the New York meeting in the autumn of that year, by Dr. C. B. White, President of the Louisiana State Board of Health.

Upon this map will be found the locality marked at which each of the 259 fatal cases of cholera terminated, and it will be observed that they are with but few exceptions situated in the central third of the city, and that with the exception of the cases carried to the Charity Hospital, in but two instances out of the first 25 cases did more than one fatal case occur in the same house. In the month of February but two cases occurred in the city, and they were fully one-and-a-half miles apart. In the month of March sixteen deaths occurred; they were scattered over the entire central third of the city, and in only one house did a second case occur. In the month of April ninety deaths occurred; confined exclusively to the same central district. One of these deaths occurred in a house previously infected; in three houses two deaths occurred, and in one house three deaths took place.

While the localities of death of the first twenty-five cases were widely scattered throughout the central third of the city, and had evidently nothing in common, so far as the local conditions of their habitations is concerned, still it is a matter worthy of careful consideration that these twenty-five individuals were *all* persons who were connected either directly or indirectly with the levees.

During the investigation every effort was made to find early non-fatal cases, but in vain. Few medical men could be found who interested themselves in such matters, and unfortunately those who were interested had no facts they were willing to impart.

The record from the second row of asterisks upon page 104 to the record of Jefferson Parish, on page 112, is the result of my own unaided investigation, although the stolidity of the public printer caused it to be attributed to another.

That as early in the epidemic as the latter part of March, steamboats leaving New Orleans were infected with cholera, is evident from the fact that on the 30th and 31st of March two steamboat men died of the disease in New Orleans, both within a few hours after reaching that city. But there are other facts which more clearly indicate that the river-steamers were infected at an early date, probably before the city itself was involved.

Early in May cholera occurred among a gang of white labourers employed in building a new levee near Convent, St. James Parish, some hundred miles above New Orleans. These men were from various points on the river, and had been brought to Convent on a boat.[1]

On the 8th of April a case of cholera occurred in the city of Vicksburg, Miss., distant from New Orleans 228 miles, and on May 12th a second case was noticed. Both of these individuals were men who were in constant contact with river-steamers.[2]

On the 15th of April a cholera case occurred in the city of Memphis, Tenn., distant from New Orleans 393 miles, in the person of a labouring man who had but a few days before come up the river on a boat; and on the 30th of the same month a man who kept an eating-house on the river, at the wharf where freight is discharged and received by two railroad companies, died of cholera.[3]

On the 17th of April a case of cholera was seen at the town of Osceola, Arkansas, distant 480 miles from New Orleans. This case was in the person of a man who had just returned to his home at Osceola from a visit to Memphis; the last-named city being 87 miles below Osceola on the Mississippi river.[1]

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[1] *Cholera Report*, p. 113.

[2] *Ibid.* p. 121.

[3] *Ibid.* p. 137.

It is therefore evident that if this outbreak is to be attributed to local causes, we have the singular occurrence in the space of eighty days of five distinct explosions of cholera at localities far distant from each other, resulting at New Orleans in 109 deaths; at Convent, 100 miles up the river, in nineteen deaths; at Vicksburg, Miss., 228 miles up the river, in one death; at Memphis, Tenn., 393 miles up the river, of two fatal cases; at Osceola, Arkansas, 480 miles up the river, in one death, and three non-fatal cases.

If Dr. von Pettenkofer will take the trouble to study the pages of my report, he will learn that subsequent to the dates I have given him, the disease appeared at many points on the Mississippi river between New Orleans and Osceola; as at Concordia, Baton Rouge, Port Hudson, Vidalia, and Delta in Louisiana; Deer Creek, Grenville, and Friar's Point in Mississippi; and he would also learn why cholera has never appeared in the beautiful city of Natchez, which lies on the Mississippi river between New Orleans and Vicksburg, with a population of 10,000 inhabitants. Many other places than those mentioned became infected at later dates, but at each the initial case of the outbreak was invariably connected with persons who arrived on river steamboats.

Up to this point of the investigation the evidence is mainly circumstantial, but on the 13th of May the steamer *John Kilgore* left the city of New Orleans for Cincinnati, Ohio, and all intermediate points. Upon this boat was a Mr. John Schenck, whose residence was near Cincinnati. Before the *Kilgore* reached Vicksburg, Mr. Schenck was taken with cholera, and when the boat reached Vicksburg, he was in the stage of collapse, and Dr. D. W. Booth was engaged to accompany him and render such medical aid as was possible. Fifty miles above Vicksburg Mr. Schenck died. His body was carried to Memphis, Tenn., where it was placed in an air-tight metallic casket, and was forwarded by railroad to his home. Dr. Booth, who left the *Kilgore* at Lake Providence, states[2] that the steamboat was crowded with passengers, many of whom were on deck. From Memphis the

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[1] *Cholera Report*, p. 127.

[2] *Ibid.* p. 122.

*Kilgore* proceeded on her journey, and the next point at which we meet her is at Paducah, Ky., where she arrived May 18th. At that time there were at least three cases *in extremis* on her deck. She remained at Paducah about one hour, during which time a Mr. W. G. Baldwin, the shipping clerk of the Limburg Tobacco Warehouse Company, was detained on her by business. On the 20th Mr. Baldwin had diarrhœa, and he died of cholera on the 21st.[1]

After the *Kilgore* left Paducah three persons died of cholera on her deck. One was buried at Shawneetown, one near Rome, and one near Evansville, Indiana,[2] while a fourth was left on the wharf at Evansville, in the stage of collapse, and died a few hours after the boat left that city.[3]

On the 22nd of May, the *Kilgore* reached Cincinnati, with a number of cabin and deck passengers from New Orleans ; as determined by the records of the Cincinnati Chamber of Commerce ;[4] notwithstanding the assertions of the Cincinnati Health Officer, who states that " all the deck passengers left the boat at Louisville, Ky."[5]

The first cholera death in Cincinnati during this epidemic was at the Cincinnati Hospital on the 27th of May, in the person of a man who was taken ill at the steamboat landing. Of this case the statement of the Health Officer of Cincinnati (p. 332) is shown by the statements of undoubted authority[6] to be utterly unreliable.

I might again take up the chain of evidence and show Dr. von Pettenkofer how the cholera of 1873 in the United States was carried along the line of other American rivers by human agency; but as it is easily in his power to familiarise himself with the narrative, which clearly demonstrates that the disease in the United States was diffused by human agency in each epidemic since 1832, when it was for the first time *imported* into North America, I must for the present abandon the task, and will now show him how the disease of 1873 was diffused through certain drainage regions.

It will be remembered that on the 15th of April a fatal case of cholera occurred in the city of Memphis, Tenn., in the person of a man recently arrived from down the river, and that on the 30th of the same month another case occurred in a man who kept an eating-house at certain wharves on the river, at which two railroad companies discharged and received freight. Dr. von Pettenkofer must perhaps be informed that Memphis is the terminus of several great lines of railroads, and that at those wharves freight is exchanged between railroads and steamboats. The third case occurred in the person of a contractor on the line of the Memphis and Paducah railroad, then being constructed. This man's home was in the same block of houses in which the first case had died, and he was a frequenter of the wharf eating-house. The contractor was taken with cholera at his camp on the line of the works on the 1st, and died on the 3rd of May. The camp was some twenty miles from the city. The disease spread rapidly through all the camps on the line of the works, in each of which were gangs of convicts from the Tennessee State Penitentiary. From these camps the disease was again carried back into the city of Memphis.[1]

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[1] *Cholera Report*, p. 260.

[2] *Ibid.* p. 347.

[3] *Ibid.* p. 378.

[4] *Ibid.* p. 347.

[5] *Ibid.* p. 331

[6] *Ibid.* p. 348.

The disease having been recognised as cholera, the convicts were ordered back to the Penitentiary, which is located in the city of Nashville, where they arrived on the 10th of May, and of *necessity* infected the prison with cholera, which first assumed the diarrhœal form. If Dr. von Pettenkofer will study the narrative on page 141 *et seq.* of the *Cholera Report,* he will learn how a drain from a Penitentiary established one focus in the city of Nashville, and how a party of discharged convicts established another in an opposite portion of the city. He will also find in the narrative that all the local influences are discussed, and I am assured in my own mind that he will be forced to admit the agency of infected individuals in diffusing cholera in that point at least.

I should so much like to accompany Dr. von Pettenkofer on a journey through Tennessee. It is to him a *terra incognita.* I should like to tell him all about the epidemic at Shelbyville, Murfreesboro', Farmingham, Chattanooga, Knoxville, Greenville, and a host of lesser points. Upon another railroad I should like to show him Goodletsville, where some of the wonderful receipts[2] were written, also Evin and Union City; upon another road Lebanon, Gallatin, and Russellville. I should also like to show him how the disease was carried from Tennessee into Kentucky, and to tell him the story step by step. It would be a real gratification to me could I do this, for among other curious things I would show him the supreme folly of his Bengal friends as to the epidemic in Wilson County;[1] but as I cannot do this in a few lines, I will content myself in asking his attention to a few points in the Kentucky epidemic.

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[1] *Cholera Report*, pp. 137-141.

[2] *Practitioner*, p. 236.

The work in that State (Kentucky) cannot be counted in the 238 days, for at it I had a clear start of one year.[2]

I have shown that the first cholera case in Kentucky in 1873 was at the city of Paducah on the 21st of May, after contact with the steamer *John Kilgore*. This case was followed by four non-fatal cases.[3]

But no epidemic of the disease occurred until after June 3rd, when a German woman, who had been visiting friends in Memphis, Tenn., arrived at her home and died the next day of cholera. From that case the epidemic commenced.[4]

The town of Bowling-Green was infected from Gallatin, Tenn., and from Evansville, Indiana.[5]

The town of Franklin was infected from Gallatin, Tenn.[6]

The city of Henderson was infected from Nashville, Tenn.,[7] and in the same way the appearance of cholera in every locality which was infected with it can be accounted for.

As all this was long ago given to the world, there is absolutely no excuse for again going over the ground for Pettenkofer's ignorance; but there are two distinct outbreaks to which we would especially ask attention, and for which I can personally vouch, as the instances were under my own observation.

I. Lancaster, Ky. On the 10th of August, 1873, a man arrived at this town from Russellville, Tenn., which place, at the date of his departure therefrom, was infected with cholera. This man was sick at the time of his arrival at Lancaster, went at once to bed, in a few hours cholera was fully developed, but the man did not die until August 22nd; but in the interim, between his arrival and decease, nineteen cholera deaths occurred, all of which are clearly traceable to him. Before the epidemic subsided, on or about September 5th, thirty-four deaths had occurred, and the disease had been carried into the adjoining counties.[1]

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[1] *Indian Annals of Medical Sciences*, p. 8, Review.

[2] *Reports and Papers, American Public Health Association*, vol. i. 1873.

[3] *Cholera Report*, p. 261.

[4] *Ibid.*

[5] *Ibid.* 265.

[6] *Ibid.* p. 266.

[7] *Ibid.* p. 270.

II. Lebanon, Ky. It is shown upon p. 294 of my *Cholera Report*, that a negro from the Memphis and Paducah Railroad, after the cholera outbreak on that line of road, went to work upon the Ohio and Cumberland Railroad in Taylor County, Ky., and it is shown upon pp. 306-308 how the disease was carried from the last-named railroad line into the town of Lebanon, and how the water of a certain well became infected with the excreta of certain cholera cases. It is shown that the water from that well was used at the Marion County Fair, and it is clearly shown that the epidemic in the town of Lebanon is attributable to that water—for among the many hundreds of people who visited the Fair and drank none of the water, no cholera occurred. It has been shown that upon the termination of that Fair, the disease was carried into many isolated and healthy communities, and that from the town of Lebanon the counties of Marion, Washington, Nelson, Taylor, Adair, Boyle, Clinton, and Mercer were infected with the disease.

One of the most interesting accounts will be found in the narrative of Clinton county [2] in which it is shown that the arrival of a cholera-infected individual occasioned a house-epidemic at an extremely isolated and salubrious locality, on a spur of the Cumberland Mountains, and in which locality no miasmatic causes were known.

This *exposé* could be indefinitely prolonged; it is quite a case of *embarras de richesse.* The narrative of all the states which were infected with the disease abounds with instances which prove the paramount influence of human agency in the diffusion of the disease. But before abandoning this subject, we would call attention to the fact that at certain localities depôts of infection were established, from which the disease was diffused along the lines of travel. Such depôts of infection may be divided into two classes, a major and a minor class. To the former belong the cities of New Orleans, Memphis, Nashville,

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[1] *Cholera Report*, pp, 300-305.

[2] *Ibid.* p. 322.

Lebanon, and St. Louis; to the latter, Cincinnati, Chicago, and a number of smaller towns. Why the area of infection was confined to the great region known as the Mississippi valley I propose to demonstrate at a later period, and if it is not clear to Dr. von Pettenkofer's mind, after a more attentive study of the *facts* contained in my report, that the cholera epidemic of 1873 was diffused through certain portions of the United States by human agency, I abandon the task of endeavouring to make it so; for none is so blind as he who will not look.

(*To be continued.*)

# NOTE ON CHOLERA.

BY W. ROBERT CORNISH, F.R.C.S.,

*Sanitary Commissioner, Madras.*

In the March number of the *Practitioner*—Department of Public Health—I see that Dr. Max von Pettenkofer repeats a story with reference to a conversation he had with General Sir Patrick Grant on the precautions taken to prevent an outbreak of cholera in a European regiment marching from Bangalore to Madras just twenty years ago. The story as related by Pettenkofer was given to the British public in the *Lancet* of September, 1871, by Professor G. Rolleston of Oxford, and immediately on seeing the statement I contradicted it, my letter being published in the *Lancet* of 11th May, 1872. Mr. C. Macnamara, in his *History of Asiatic Cholera*, pp. 248, 249, quotes both the statement and the refutation, and notwithstanding this public denial I see that Pettenkofer repeats the story in support of his view that cholera is not influenced by the nature of the water supply, just as if his facts had never been questioned. It so happens that Mr. Madden, deputy surgeon-general, is now in Madras, and this officer was in medical charge of the wing of H. M.'s 43rd regiment when the cholera outbreak quoted by Pettenkofer occurred, and he assures me, that the statement regarding water having been carried from a healthy district for the use of troops while passing through a tract invaded by cholera, is a pure fiction. Deputy surgeon-general Madden reminds me that the march of the regiment was undertaken at twenty-four hours' notice, in order to relieve a corps in Madras ordered for active service in Persia, and that even if any orders had been issued on the subject of carrying pure water, there was no time to make the necessary arrangements. As a matter of fact the water issued for the troops was taken from the several villages in which cholera prevailed, and the efforts of the officers to isolate the men of the regiment from the infected villages were nugatory, and the official records of the regiment prove that the first cases of cholera occurred in men who had been straying from the camp to infected villages in search of drink. The late deputy-surgeon general A. Barclay's contradiction of the statement was just as emphatic as Dr. Madden's. Dr. Barclay was at the time surgeon to H. M.'s 43rd regiment. This example should therefore be eliminated from the store of Dr. Pettenkofer's facts regarding the mysteries of cholera.

## ERRATA.

In Professor Pettenkofer's Paper on the " Ætiology and Prophylaxis of Cholera," in the *Practitioner* for February and March, 1877.

Page 138, line 13 and 14 from bottom, *instead of* " to which," *read* " beyond which."

Page 139, lines 21, 23, and 27 from bottom, *instead of* " Castinga," *read* " Katinga."

Page 139, line 22 from bottom, *instead of* " overflowed its banks as far as to," *read* " passed."

Page 140, line 18 from top, *instead of* " letter carriers," *read* " doolie bearers."

Page 141, lines 7 and 15 from bottom, *instead of* " typhus," *read* " typhoid."

Page 143, line 10 from top, *instead of* " Naugrug," *read* " Nowgang."

Page 143, line 20 from top, *instead of* " Jullinder," *read* " Jullunder."

Page 144, line 3 from top, *instead of* " patients," *read* " places."

Page 149, line 16 from top, *instead of* " more," *read* " mere."

Page 235, last line } *instead of* " For . . . . strong," *read* " such reasoning is
Page 236, first line } quite unscientific."

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⁂ Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Baillière, of King William Street, Charing Cross.

# THE PRACTITIONER.

AUGUST, 1877.

## Original Communications.

### ETHERISATION AND ITS DANGERS.

BY OCTAVIUS B. SHREVE, A.M., M.D.,

*Surgeon to the Salem Hospital, Massachusetts, U.S.A.*

THE action of ether is identical in many respects with that of dilute chloroform. The first effect upon the heart of etherisation is an increase in the force of its action. This effect of ether is familiar to every American surgeon who is called upon to operate on patients who have been the unfortunate victims of railroad or other accidents, and are in a state of shock. The pulse, in this condition, is generally frequent, irregular, fluttering, or feeble, at the wrist. After the administration of ether-vapor for a short time, it becomes more perceptible, steady, and regular. This stimulation of the heart's action by etherisation is followed by depression, but not nearly to the same degree as when chloroform is similarly administered. When etherisation produces death it is partly caused by enfeebling the action of the heart, but mainly by arresting the movements of respiration the pulsation of the heart continuing for a long time after all respiratory movements have ceased.[1] Flourens[2] states that if the inhalation of ether be sufficiently prolonged, the sensory and finally the motor functions of the medulla oblongata are compromised, and death, by paralysis of the respiratory centres, ensues.

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[1] *A Treatise on Therapeutics*, etc., by H. C. Wood, jun. M.D., 1874.

[2] *Comptes Rendus*, vol. xxiv. 1847.

"The order of involvement of the nerve centres, in man and animals, is first the cerebrum, next the sensory centres of the cord, next the motor centres of the cord, next the sensory centres of the medulla oblongata, and finally the motor centres of the medulla oblongata."[1] The experiments of recent observers show that the diffusible agents, like alcohol, ether, chloroform, and chloral, can pass almost immediately through the intercellular substance of the brain to the protoplasm and thus produce a direct action upon the nerves and muscles.

The dangers to be avoided in the administration of ether are the arrest of respiration and the heart's action. These two actions follow last, as was shown by Flourens, and commonly are only manifested from an overdose of the drug, that paralyses the respiratory and cardiac ganglia. But I hope to be able to show that a state of anæmia tends, among other causes, to produce in patients a great susceptibility to stoppage of respiration and the heart's action even when the vapour of ether is administered with the greatest care and in small quantities.

The breathing is the key-note to the condition of the patient during etherisation, and every breath the patient draws ought to be carefully watched by the person who administers the ether. Nor is it sufficient to know that the patient breathes, for if the act is accomplished in a superficial or irregular manner, after the subject is fully under the influence of the anæsthetic, it is a symptom of danger not to be disregarded. The looks of the patient are another valuable indication of his safety when etherised. If the face becomes very dusky-red, as is often seen in the beginning of etherisation, when the patient does not get sufficient atmospheric air; or very pale, as when the patient has been for a long time under its influence, or when syncope intervenes, with the look that patients have in a condition of collapse, with lips pale, clammy moisture upon the skin, and shrunken and contracted appearance of the countenance, together with shallow breathing, there is great danger.

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[1] *The Practitioner*, November, 1876, "On the Action of Alteratives," by James Ross, M.D.

## ACCIDENTS THAT MAY APPEAR DURING ETHERISATION, AND THEIR TREATMENT.

1. *Falling Backward of the Tongue.*[1]—This may occur from paralysis of the muscles of the tongue. The symptoms of this are duskiness of the face and superficial breathing, caused by the closure of the glottis.

2. *Paralysis of the Muscles of the Larynx.*[2]—The symptoms are duskiness of the face and a croupy sound in breathing.

3. *Syncope.*—The insufficient supply of blood to the brain takes place from a variety of causes during etherisation. An anæmic condition of the patient, a condition of general debility, a weak heart, the position of the patient, particularly Sim's position for operation on the female genito-urinary organs, sitting, or on the face, for operations on the back, and from the action of the ether itself,[3] or from prolonged etherisation. As "the emotions of shame, of anger, and others, cause the face to become red from dilatation of the blood-vessels, and a like effect is produced in the vessels within the cranium,"[4] so the paleness of the face, in prolonged etherisation, is an index of the anæmic condition of the brain. Among other causes of syncope may be mentioned a sudden gush of hæmorrhage during an operation, and the age and idiosyncrasy of the patient. Not only the condition of the body, but that of the mind, must be considered as having a direct bearing on the proneness to syncope of those who are obliged to undergo operations. A patient who, while suffering mental agonies from the dreaded anticipation of an operation, feels a sensation of pain, not being entirely under the anæsthetic effect of ether, is very liable to faint from the shock.

4. *Vomiting.*—The only danger from this source is when the stomach is loaded with food. This condition is seldom met with except in cases of accident requiring surgical aid, when the stomach of the injured person contains undigested food. By the act of vomiting the food is lodged in the pharynx, and by a sudden inspiration is drawn into the glottis and bronchi.

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[1] *The Practitioner*, January, 1877, "Chloroform," by John Chiene, M.D., etc.

[2] Ibid.

[3] Carter, *Brit. Med. Journal*, 1867.

[4] Hammond, *Diseases of the Nervous System.*

5. *Blood.*—In operations about the mouth and nose, blood and coagula may become a serious source of danger from their presence in the larynx and trachea.

6. *Arrest of Respiration.*—Under this head it is not intended to include the voluntary holding of the breath, so often witnessed in the early stages of etherisation, but rather the paralysis of the motor functions of the medulla oblongata and the respiratory centres. The early symptoms of this condition are paleness of the whole surface of the body and of the face and lips, also superficial breathing and a decrease in the strength of the pulse. When a patient is in this condition, a small amount more of ether is sufficient to produce entire arrest of respiration, and if relief from this is not immediate, the ganglia that preside over the heart's action become next involved, and death is the result. This accident may occur suddenly and without much warning, the pallor and arrest of respiration taking place simultaneously. The condition of the pulse during the arrest of respiration is not of the greatest importance, and does not furnish an experienced physician with much more knowledge than a glance at the patient affords. It is generally weak, and in the cases I shall report was regular. In experimentation on animals where the etherisation is continued until the respiration ceases, the heart's action continues for some time. This condition of the heart's action was noted in the three cases appended to this article.

7. *Arrest of the Heart's Action.*—When this is due to the poisonous action of etherisation on the medulla and cardiac ganglia the patient is dead. Push the etherisation of the animal that you have experimented on beyond the stoppage of respiration and the heart will beat for some time, but when it stops entirely you will be unable to resuscitate the animal and make the paralysed heart commence its beat. Deaths take place from ether that are attributed to other causes, as a weak heart, shock, &c. If we had this same condition of shock to treat in a patient whose system was free from the benumbing effect of a volatile poison, and able to swallow an undiluted stimulant, he would probably be roused to life again ; while the same amount of shock taking place in a person profoundly etherised would be fatal and should be fairly attributed to the ether.

TREATMENT.—1. *Falling Backwards of the Tongue.*—Turn the head to one side, and the tongue by its weight will generally fall and leave the glottis free. If this is not immediately successful, seize the tongue with forceps and draw it forward between the teeth.

2. *Paralysis of the Muscles of the Larynx.*[1]—Pull the tongue forcibly out of the mouth, by doing this you draw forward the epiglottis, and thereby stretch the aryteno-epiglottidean ligaments and secure immediate opening of the vocal chords. The treatment of these two conditions must be immediate, or the respiration ceases, the lungs become gorged with blood, and the heart ceases to act. It has been recommended, when the use of artificial respiration and the administration of a sharp blow on the chest, over the heart, have been insufficient to start the heart into renewed action, to[2] bleed from the external jugular vein to relieve the organ of its engorgement.

3. *Syncope, Treatment of.*—A surgeon with a patient in a state of syncope, whose nerve-centres are paralysed by ether-vapour to such an extent that the actual cautery may be applied without awakening the slightest evidence of pain, has a far different problem than a simple case of syncope presents, and one that demands great prompitude and energy of action. As this condition arises from anæmia, sudden loss of blood, or weak heart, place the head on a lower plane than the body, elevate the arms and legs, or raise the patient up by the feet.

4. and 5. *Vomited Food and Blood in the Larynx.*—Remove all solids within reach, and invert the patient.

6. *Arrest of Respiration—Treatment.*—When the first symptoms are manifested, immediately discontinue the etherisation. The only rational treatment of this condition, and one that in most cases is successful, is artificial respiration. If we can keep the patient alive by this means until the volatile poison is exhaled, the returning sensibility will enable us to resort to other expedients. Artificial respiration should be immediately resorted to, and continued persistently. Electricity and subcutaneous injections of stimulants can be applied by others at

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[1] *The Practitioner*, January, 1877, "Chloroform," by John Chiene, F.R.C.S.E., F.R.S.E.

[2] Holmes, *A System of Surgery*.

the same time, but should not in any way interfere with artificial respiration. In these cases when at all severe the first attempts at respiration are very feeble, and the artificial respiration should be continued until the breathing becomes deep and regular. Attention must be paid to the temperature of the patient, which is always low in this condition, and the surface of the body and extremities will be found to be cold. Envelope the patient in hot blankets, and apply jugs or bottles filled with hot water to the extremities.

I am far from considering that accidents from the administration of ether are frequent, yet we must not consider it entirely innocuous, and that there is no danger of death from ether. If we etherise a dog and observe keenly the successive effects on his nervous system that the drug is capable of producing—abolition of motion, sensation, reflex action, arrest of respiration, and the heart's action—and then say he died from the poison of ether, can we observe the same symptoms manifested in man, from some of the causes that have rendered him particularly susceptible to the action of ether-vapour, and with any justice say the dog died of ether and the man died of heart-disease or shock ? My attention was called to this subject by the occurrence of three cases that have come under my observation in a series of years. They were alike in the insidious suddenness of their access, and in the exsanguinated condition of the patient.

*Case No. 1.*—Was seen in consultation. The patient was a young man sixteen years of age, of dark complexion, and good muscular development, his previous habits had been good, and also his general health. One month previous he had received a pistol-shot wound. The bullet entered just above the knee, and emerged on the posterior part of the limb, just below the popliteal space. His condition when seen was that of anæmia, consequent on loss of blood at the time of the injury, and the pain and inflammation that succeeded. The pulse was regular and weak, the face was extremely pale, and respiration regular, he complained of pain in the region of the knee, which was very much swollen and tense. Ether was administered, and he passed under its effect very pleasantly; there was no excited period during its inhalation. An incision was made into the most dependent part of the swelling, and a large quantity of old clots escaped. This was followed by quite a smart hæmorrhage from the direction of the popliteal artery. This hæmorrhage was controlled by the immediate application of pressure. The respiration which up to this time had been perfectly regular and quiet in its character suddenly stopped. He had inhaled only three ounces of ether, and the sponge had been removed from his nose for a minute or two. The face and lips were extremely pale, and arrest of respiration took place with such insidiousness that it seemed as if the patient had suddenly omitted a breath. The pulse was regular and feeble at the wrist, and for a moment it seemed like the slight arrest of respiration, seen in the administration of ether where a shake arouses the patient, and he makes a deep inspiration, and goes on breathing regularly. Artificial respiration was resorted to, ammonia injected hypodermically, stimulating enema administered, all without avail, as the patient never breathed again, although the pulse continued perceptible at the wrist for some time after the stoppage of the respiration.

*Case No. 2.*—Was a case of abortion, in a lady aged about forty, married, and of dark complexion. She was fleshy and sallow, and had been flowing for forty-eight hours, when I was called to see her in consultation. Ether was administered to relieve the pain of removing the placenta, as the uterus was situated high up in the pelvis. The pulse before the operation was moderately strong and slightly accelerated. The patient passed under the effect of the anæsthetic without a struggle. The placenta was removed in pieces, it being adherent to the wall of the uterus, its removal was accompanied by no undue amount of hæmorrhage, and the etherisation was discontinued. Having examined the pulse and found it somewhat fuller than before the operation, and the respiration regular, I left the attending physician in care of the patient, and went to another part of the room to wash my hands, where I was joined by the doctor, and while engaged in conversation with him and at the same time looking at the patient, her respiration suddenly ceased. Our efforts for her relief were directed entirely to artificial respiration. After about two minutes she began to respire again, at first feebly and at intervals, but soon after with strength and regularity. The pulse was regular and weak at the wrist during the whole period of stoppage of the respiration.

*Case No. 3.*—Was seen in consultation. The patient was a lady of about forty years of age, married, and had had several children. She had been ill with metrorrhagia for eleven years, and presented a degree of anæmia that was most ghastly. Her complexion was perfectly waxy, and almost transparent in its whiteness. On digital examination of the vagina, the cervix admitted the tip of the index finger and was full of granulations. A sponge tent was introduced, and left until the next day, when it was decided to etherise sufficiently to relieve the pain of the examination of the uterine cavity. The immediate effect of the etherisation was all that could be wished. The whole lining membrane of the uterus, like the cervix, was lined with granulations and fungosities. While the attending physician was confirming my diagnosis, the respiration suddenly ceased. The head, which had been low, was placed still lower, and artificial respiration was immediately resorted to. After persistent efforts for about three minutes, that seemed an eternity, I discovered a slight superficial respiration, which we continued to supplement and assist until respiration became normal. The pulse remained about what it was before the etherisation, both as to its regularity and strength, during this whole period. I might add that the action of the sponge tents proved entirely remedial, although originally used only as a means of diagnosis.

I am full aware that such cases are rare in the administration of ether, and hope it may never be my misfortune to encounter another. The conclusion is forced upon me, that anæmia was an active factor in the production of this sudden arrest of respiration, as it was present in all three cases. In the first and third cases, where anæmia was most prominent, the symptoms were the most alarming. The continuance of the regular action of the heart, during the cessation of respiration, in cases second and third, did not cause me to feel that there was any certainty of the respiratory action commencing again; as in the fatal case, the heart's action continued for a long time after the arrest of respiration.

The action of the anæsthetic was watched with the greatest caution in all the cases, and the failure of respiration came on without the slightest warning. Death in the fatal case seemed to be caused by sudden paralysis of the motor functions of the medulla oblongata and the respiratory centres. The quantity of ether used in each case was unusually small, and the etherisation was not prolonged. In every case the patient was fully etherised before the operation began. Cases second and third would probably have proved fatal if a small quantity more had been administered, or if, from negligence, their immediate danger had not been recognised. As it is impossible to tell in all cases of etherisation when we may meet with accidents, it best to be vigilant in all.

# NOTES ON A CASE OF ATHETOSIS, PRECEDED BY HEMIPLEGIA AND HEMIANÆSTHESIA, AND ACCOMPANIED BY UNILATERAL SWEATING.

BY SYDNEY RINGER, M.D.,

*Professor of Therapeutics at University College.*

James Samson, bricklayer, aged 32, admitted into University College Hospital, January 15, 1877. Has been married thirteen years, and has four children. Always had sufficient food and clothing, and has never drunk to excess. He lived in London till 1869, since then in Canada. His father, aged 52, is subject to " dropsy in the leg." His mother, 53, is healthy; he has one brother who is healthy.

*Present Illness.*—On May 13, 1873, he drank more beer than usual, but was not intoxicated. He slept well during the night, but in the morning awoke with severe headache; but he got up and went for a walk, when a " dazzling came before his eyes," his sight became dim, he heard noises in his ears, and his face sweated profusely. He continued his walk, but feeling giddy, he looked for a seat, but not seeing one, walked on for a quarter of a mile, when he noticed that his " feet were crossing one another," and after about eight more steps he fell down on his right side and lost consciousness, he thinks only for a few minutes. When held up, on coming to, he suddenly felt as if a weight were falling off his head down the right side of his body to the foot. Taken to a seat and left for a short time, he fell off the chair, again on his right side, and could not get up. On recovering consciousness he found himself speechless, with loss of power and sensation in the right side and in the three inner fingers of the left hand. His face felt "drawn to the right side." After a few hours he was taken to a hospital, where hot water was applied to his feet. He got up on May 24th, and left the hospital, after a stay of ten weeks. In the first week speech returned.

*Sensation.*—He quite lost sensation in the right limbs from May 13th to 22nd, being unable to feel even a needle thrust into the right arm or leg. In about ten days he felt "needles and pins" in his right limbs, and at this time sensation began to return. The upper limb felt numb for about a month, the lower for twelve months, the numbness lasting longest in the calf and outer side of thigh.

*Motion.*—He first became able to move his right limbs on May 22nd, power returning soonest in the arm. On May 24, "something seemed to rush down from the shoulder to the hand;" the arm seemed dragged down, and he felt "as if half a hundredweight were tied round his wrist." The hand became much swollen, and looked like "mottled soap." Every morning on getting up the same "rush" occurred, followed by swelling of the hand; at night the swelling had all gone. This rushing sensation from the shoulder to the hand lasted seven or eight weeks; it then stopped from that time to the present. His fingers "have gone all shapes," his arm, too, "used to go quick on his hand." The spasmodic incoordinated movement has gradually improved.

*Memory.*—Some weeks after the fit he forgot, when talking, what he had said, or what he wanted to say.

*Headache.*—Since the fit he has had darting pains in the right side of the head, which began about an inch above the right eyebrow, and passed through the head to the right half of the occipital region. There are always two darts of pain, and it is always worse in winter.

In the summer following the attack, on taking a warm bath, he noticed that he felt much warmer on the right side, and that the right arm and leg perspired much more than the left. This unilateral sweating has continued since, especially in summer, and even in winter, when he "feels very nervous." We have several times verified this statement.

The paralysis of the fingers of the left hand varied much, getting better, then relapsing for about three years, and then steadily improving. He came to England last December.

*Present Condition.*—Patient is a small, somewhat muscular man: height 5ft. 3in. Hair black, turning grey. Face pale. Eyes greyish blue: arcus senilis just appearing: sclerotic injected and slightly yellow. Skin normal, no eruption. No sweatings. Temp. normal. He has an obstructive and regurgitant mitral murmur with a distinct presystolic thrill. The heart is neither dilated nor hypertrophied, but on exertion he suffers from palpitation. He has never had rheumatism.

*Cranial nerves.*—1st—natural; 2nd—sight good, equal on each side, no hemiopia; 3rd—pupils contract a little to light, but perhaps not with normal readiness; no paralysis of the muscles of the eye; 4th—normal; 5th—normal; 6th—slight internal squint of right eye; 7th—slight deficient action of muscles of the right angle of the mouth; the right eyebrow is not raised so well as the left; 8th—normal; 9th, 10th, 11th, 12th—normal. Sometimes, when excited, the eye-balls "twitch."

The right upper and lower limbs are in a state of continuous spasm, chiefly noticeable in the hand and foot. The same muscles are not always affected; nor is there always the same degree of contraction, so that the spasm varies both as regards degree and the muscles involved. Voluntary power remains, but it is imperfect, but only on account of the "mobile spasm." Thus the performance of a trifling voluntary act often occupies some time, perhaps a minute, and is then usually an exaggeration and, I might say, a burlesque of the act aimed at. To make myself better understood, let me describe certain voluntary acts. When told to open his left hand, generally spasmodically closed, it is obvious that he is making a strenuous effort, and after a few seconds, or longer, the fingers slowly unbend, and become over extended, being separated widely apart, with the last phalanges curved backwards. Often the limb moves readily; thus in buttoning the left wristband, the right hand goes directly to the place and the fingers begin to act, but in a clumsy fashion. The button is seized by the thumb and forefinger, but they are pressed too tightly together to allow the button to glide into the button-hole readily, and the fruitless attempt increases the spasm. This exaggeration always occurred in voluntary movement, till at last the spasm became strong enough to overcome voluntary movement, and the limb assumed an incoherent position. In voluntarily overcoming the spasm the first movement was his chief obstacle; thus, having with difficulty begun to open the hand, the farther extension was much more readily performed. The greater the existing spasm, the longer the time before the commencement of the initial voluntary movement, and the slower its performance. Sensation is equally good on both sides of the body.

The leg is quite as erratic as the arm, and the disease chiefly falls on the ulnar nerve and the branches of the sacral plexus, though all the branches of the brachial plexus, except those supplying some neck muscles, are affected, and some of the branches of the lumbar plexus are also involved. Some of the ulnar muscles were always affected, and I never saw any movement through other nerves without strong contraction of some, generally of most of the ulnar muscles.

When awake his right fingers and thumb are always flexed, though the position of the fingers and thumb varies somewhat. Told to open his hand, he does so slowly, and in the inverse order in which the fingers so frequently recontract; that is, the finger last to contract is the easiest to open. When the hand is opened, the fingers are widely extended, and the last phalanges a little bent backwards, obviously from strong action of the dorsal interossei muscles. Then in a short time, especially if his attention is diverted by conversation, voluntary extension becomes relaxed, the fingers become slowly flexed, first at the metacarpo-phalangeal articulation, so that the fingers are flexed straight, and are at the same time approximated, this combined movement being due to the palmar interossei. The little finger is the first flexed, and has nearly touched the palm before the ring finger begins to move, then follows the second, and last the forefinger. Next, the fingers become slightly bent at the first phalangeal articulation (superficial flexor), and at last the fingers are pressed firmly against the palm, the last phalanges still remaining flaccid, the deep flexor muscle not contracting. When the hand is closed the thumb becomes flexed and adducted into the knuckles of the fingers (ulnar nerve). This order of contraction is sometimes departed from; thus, after the little and ring fingers have become partially flexed, the thumb is flexed and adducted into the palm, and the middle and forefinger become flexed over the thumb, its tip protruding between the middle and ring finger. Sometimes lesser degrees of the same movement occurred; thus the fingers were only partially flexed at the metacarpo-phalangeal articulation; or the ring and little finger were closed, whilst the middle finger was only slightly flexed the forefinger being extended, or both ring and forefinger were extended, but the thumb was always in these different combinations more or less flexed and adducted.

In addition to these contractions others were often added of a very varying kind, giving a great variety in the combinations of different muscles, and in the degree of their contraction. Thus the wrist was often strongly flexed, mainly from contraction of the flexor ulnaris, but also in varying degree from the other flexor muscles. When due chiefly or entirely to the flexor ulnaris the hand was of course strongly adducted as well as flexed, the forearm was often very powerfully pronated from contraction of both pronators, and often in addition to strong flexing of the fingers and wrist the arm was bent on the shoulder from strong contraction of the biceps. Besides all these contractions, sometimes the arm was slightly raised by partial contraction of the deltoid, and the whole arm pulled a little back, the strongly pronated and contracted hand being brought close to the axilla.

At other times the forearm was strongly extended and drawn backwards behind the back, being sometimes turned inwards, at other times outwards, the extension being due to contraction of the triceps and the back position with rotation outwards to the deltoid, teres major, and infra spirales; the rotation inwards to the latissimus dorsi, &c.

Occasionally the forearm was powerfully supinated; and sometimes the extensor muscles were hard and rigidly contracted, but this occurred when the flexors were in the same condition, so that in no instance did we see the hand or fingers moved by the extensor muscles; these muscles contracting simultaneously only with many others, and especially the flexors. In fact, the musculo-spiral nerve muscles were the least often affected, especially those supplied by the posterior interosseous nerve. The triceps and supinator longus were more often affected than the extensors of the hand.

Sometimes, from excitement, or when startled, the fore or middle finger, or both, being flexed at the time, would start out and become rigidly extended; but this extension was due to the dorsal interossei muscles, judging from the character of the extension, the first phalanx being rather flexed and the two last being bent rather backwards. Sometimes the shoulder was depressed, and was generally so when the arm was carried behind the back, this depression being due probably to contraction of the rhomboidei muscles. In no instance did we detect any movement of the neck muscles supplied by the brachial plexus.

The leg is as strongly affected as the arm. When lying on his back in bed we notice prolonged spasm of the extensors and flexors of the toes, the flexors however generally prevailing. Thus the foot is extended and the toes strongly flexed, though still the extensor muscles are hard, and their tendons to the toes stand out like strong tight cords. The extensor of the great toe is especially contracted, and produces a curious deformity; the last phalanx of this toe being strongly flexed, but the first rather extended. Remaining in this state a few minutes, the toes being rigidly fixed, there occurs a rapid, almost vibratile movement of slight extension and flexion in the great and second toes. After this has lasted a few seconds the flexor of the great toe appears to relax, and the extensor draws it up, so that it stands almost at a right angle to the dorsum of the foot, the other toes remaining flexed; then in a few seconds the great toe itself again becomes flexed.

In addition to these contortions, under excitement or voluntary movement in any part of the body, the foot becomes strongly inverted, or less frequently everted. Sometimes the whole leg is rotated inwards, at other times rotated outwards. When made to walk the movements became still more extensive, varied, and continuous, justifying much more characteristically the name athetosis. When walking the movements of the right leg are stiff. The knee is generally a little flexed, and the limb slightly rotated outwards. At one time he plants only the toes and the pad behind them on the ground, then in a few seconds he walks on the heel, then on only the outer part of the foot, and again the foot becomes strongly everted, so that he walks on its inner part, these differing postures repeatedly following each other. Sometimes the thigh becomes much more flexed; and during walking all the leg and thigh muscles feel hard, and seem to be partly contracted, thus rendering his walk stiff and constrained. While walking his arm is almost always strongly extended behind his back, being rotated sometimes inwards, at other times outwards.

Voluntary action considerably increased the movement both of arm and leg; the increase being much more marked in the limb voluntarily moved. Thus, walking greatly increases the intensity and extent of the arm movements, and voluntary action of the arm increases the leg movements. Some acts seem particularly to excite the movements, for instance, acts requiring fine adjustment and complex combinations, as writing. On being told to write his name, on taking the pen between his thumb and two forefingers some seconds elapse before he can begin, and then by a strenuous effort he begins his name, the lines being very tremulous, from the strong spasm which he can only partially control. Before finishing his name he was obliged to stop several times, and on each occasion he experienced increased difficulty in renewing the attempt. In trying a second time his difficulties were much enhanced through the augmented intensity of the spasm, and sometimes the arm became fixed, and could not be moved a bit; at last the spasm of the whole forearm and hand became so marked that he could write no more. Whilst this was going on there was increased spasm in the foot and leg; the spasms in these members becoming much more intense, and at last involving some of the thigh muscles. The effect on the great and second toe was very curious, both at first being powerfully flexed, but the first phalanx of the great toe was extended so as to suggest a claw-like appearance. In a short time both toes became affected for a while with a rapid though limited flexion and extension movement, and then the great toe became strongly extended.

Voluntary movements of the healthy left side considerably increase the movements on the right side, though less than voluntary movements of the affected side. Thus when told to write with the left hand, this action greatly increased the movements in the right arm and leg; and on being told to move the fingers quickly on a board, as if playing on a piano, the attempt induced still greater movements in the damaged side. When told to write with his healthy (left) hand, he took the pen, but could move neither arm nor hand; and he used the curious and suggestive expression, that "it seemed as if the other side kept back the hand." To us it seemed as if the force set free by the voluntary effort was diverted, as it were, from its intended destination, and ran into the central nervous structures controlling the right arm and leg, producing increased movement in those parts.

Emotional excitement increases the movements in the right limbs "more," as the patient remarked, "than anything else," more even than voluntary acts; thus, if startled or suddenly awakened, the movements became excesssive. When crossing a street, if a cab came quickly down on him, impelling him to hurry, the movements became greatly aggravated, and "to save his life he couldn't move;" and this, it should be remembered, although he retains full use of his left limb, and can hop well on the left leg. Here, too, it seems that all the force set free in the voluntary effort to move is diverted from the left side, and runs into the right side, producing in its muscles uncoordinated and spasmodic action.

Sometimes when excited the right leg is strongly drawn up, so that he is obliged to stand on one leg.

Spasmodic contractions also are produced, and are increased reflexly. Pinching or pricking the skin with a pin does not, it is true, produce the contraction, but on extending a contracted muscle it instantly recontracted far more strongly. Thus, when I extended one of the flexed fingers or toes the *whole* of the flexor muscles of the right side became far more powerfully contracted without complicating any other muscles. Moreover, some muscles, even when uncontracted by spasm, become contracted on attempting to straighten them. Thus the superficial flexor of the arm was often powerfully contracted, the deep one remaining relaxed; hence the middle phalanx of the finger was tightly pressed in the palm whilst the last phalanx remained flaccid. On pulling the last phalanx of one finger away from the palm the deep flexor contracted, whilst all the terminal phalanges were strongly pressed on the palm.

Warmth increases the movements considerably. The limbs, says the patient, are in summer more sharply contracted, and the movements are more frequent and more incoherent. Mr. Bury placed the right foot into a bath of hot water, and its muscles soon began to contract violently, the foot being inverted and everted with great force, the man describing "it as ten to one worse." After the removal of the foot from the hot water the aggravation persisted some time. On another occasion I forced the left foot in hot water, so hot indeed that at first it gave him pain, so that the emotional condition thus induced certainly increased the movements. However, on reducing the water to a comfortable temperature, the movements, if at all, were very slightly increased; the man himself thought they were a trifle. Warmth to the right foot very decidedly increased the movements in the right arm, but as the contraction of the right leg caused considerable pain, possibly the arm movement was due to this circumstance.

The hurtful influence of heat is further exemplified when the sun falls across his shoulders; then, he says, the arm shoots above his head, and if by a strong voluntary effort, or with the aid of the other arm, he pulls down to his side the upraised limb, when the hold is released, or the voluntary effort is exhausted, back it flies immediately to its former posture. Whenever, he says, the warmth of the sun is on his back it produces difficulty of breathing "from want of movement of the right side of the chest;" whence it is probable that the muscular contractions sometimes invade the right side of the trunk, and I may add here that during a deep inspiration I find by measurement that the left expands considerably more than the right side.

When standing with his eyes shut he says "all the time I am thinking of my right side, lest I should fall;" though when engaged in conversation, so that he forgets himself, the movements are not increased, nor does he seem at all unsteady. Walking, however, with his eyes shut much increased the spasm. "The limb," he says, "is stiffer;" in fact it is very apparent that voluntary movement under these circumstances becomes far more difficult and limited, but the disability passes away when he opens his eyes.

During the early part of the attack he states that the movements were greater during sleep than when awake, but this is not now the case, for careful watching at night has detected no movement of the right side. On examining his hand during his sleep both Mr. Bury and I have found it a little flaccid, with the fingers a little flexed, but immediately he wakes spasm seizes both hand and foot.

He has paroxysmal exacerbations occurring sometimes twice or three times a week, sometimes delayed a week, and then they are always very severe. These attacks last three or four hours, correspond in all respects to those described a little further on, induced by the subcutaneous injection of strychnia. These attacks are generally precipitated by some emotional disturbances, and for a day or two afterwards the movements are less severe.

The involuntary contractions do not cause any sensation of tiredness, though voluntary movements of the right side soon weary him.

There is no permanent rigidity of any muscles of the right extremities.

There is no loss of sensation, tactile or painful, in the right side. The "muscular sense" is also intact. There is no hypertrophy of the muscles of the right side. The left side is quite normal.

On January 30th we injected $\frac{1}{25}$th gr. of sulphate of strychnia into the calf of the left leg without any apparent effect. Subsequently, on three occasions, we repeated the injection at intervals, $\frac{1}{16}$th gr. into the left leg, and $\frac{1}{16}$th and $\frac{1}{30}$th gr. into the right leg, and in each instance the injection induced great increase in the movements, the left side remaining unaffected. In fact the strychnia produced in the right side convulsive movements identical with those described by Dr. Ferrier as arising from electric stimulation of the corpus striatum. It is better, I think, now to give the notes of his condition taken at the time by my assistant, Mr. Bury, and by myself. On giving the first injection, January 31, the pulse was 108 and the respiration 30. Immediately afterwards the movements became more active, and in a quarter of an hour the limbs were in constant movement, the contraction of the muscles being very powerful, some seconds elapsing before they relaxed and another set became contracted. The breathing was hurried and panting. He complained of great pain in his limbs and of dry mouth, pulse 124, respiration 52. In fifty minutes violent spasms of the right leg set in, and, he said, the muscles felt as if they were torn. In one hour and a quarter there was slight opisthotonos and pleurosthotonos. Breathing very hurried, pulse 140. The movements, with the exception of the pleurosthotonos and opisthotonos, were not at all tetanic, but a very great aggravation of those habitually present. Three hours after the injection I found him a little better, each contraction being shorter, and the muscular movements were more rapid. He complained of great faintness, and looked anxious. *The movements were then quite continuous, the limbs never keeping in any position more than a few seconds,* and all the muscles of the limbs being in turn attacked. *It was at this time a genuine case of athetosis after Hammond's original description,* though the muscles involved were more numerous and the movements much stronger. He complained of great difficulty in breathing, saying "he could only just fetch his breath;" there was no duskiness, but it was evident that he had to breathe voluntarily, and with some effort. The respiratory muscles of the right side were evidently affected. I asked if he had been ever so bad before. He said, "Oh yes, I am like this in the hot weather, and have the same difficulty in breathing." In four hours he had recovered from the effects of the strychnia.

The following notes were taken by my assistant, Mr. Morshead. *February 7th,* 10 A.M.—Patient's movements this morning were a little excited, and he complained of a sense of impending shortness of breath. 11 A.M. We injected into the right calf a solution of about $\frac{1}{15}$th of a grain of strychnia. Pulse 90; respiration 30 per minute. Within five minutes after the injection the movements were distinctly increased. At twenty minutes the first attack of opisthotonos occurred, the back becoming distinctly arched. The movements of the right limbs were like those habitually present, only greatly exaggerated. The arm and leg were not equally affected at the same moment—whilst the one was violently convulsed, the other became comparatively quiet, the movements of the right limbs thus alternating. Adduction and flexion were the most powerful movements. Subsequently the condition was more one of pleurosthotonos, the body becoming arched, with the concavity towards the right side. At no time was anything more than some slight tremor observed of the left limbs. There was no working of the facial muscles of either side. The skin was covered with sweat generally, but no unilateral sweating was observed. During some of the more severe spasms the respiratory movements of the right chest were much diminished. The respirations were not increased in number. Musical cooing râles were present over the whole chest during the height of the attack. No cyanosis. The pulse went to 120. The presystolic thrill became more marked, and the double mitral murmur was intensified. There was no priapism. The movements and spasms reached their climax about 12.30 ($1\frac{1}{2}$ hour after injection), and then gradually subsided, and at 1.30 the condition of the patient was pretty much the same as before the injection, the râles having quite gone. During the afternoon the patient seemed a good deal exhausted, and felt much stiffness in the knuckles and ankles.

*8th.*—Had a good night. At 11 A.M. $^{1}$ th gr. of strychnine was injected into the right calf. Pulse 90. In about five minutes the movements increased as yesterday, but were by no means so violent. The pulse went to 126. No râles heard.

*9th.*—Whilst preparing to give a hypodermic injection of $\frac{1}{30}$th gr. of strychnine into right calf, the movements became greatly exaggerated, and after the injection continued to increase rapidly. The pulse at the time of injection was 90; respiration 36. Opisthotonos occurred first as before, and was followed by frequent attacks of pleurosthotonos. These latter were far more severe than on any previous occasion. The body was strongly curved over the right side of the bed (concavity towards the right side). Sometimes the right side of the body would be jerked up, so that the patient rested entirely on his left side, meanwhile uttering a sharp, involuntary cry, the arm and leg being violently extended. The longest tonic spasm observed lasted five seconds, clonic movements occurring in the interval before the next.

In other respects this attack resembled the last, except that no râles were heard. The pulse went up to 126, and respiration to 60. There was no blueness of lips.

As strychnia hypodermically given produced these curious effects, and as in chorea many authorities locate the disease in the portions of the brain probably affected in this man—moreover, as the symptoms in athetosis are so similar to those of chorea—we were led to test the action of strychnia, given hypodermically, on two choreic patients. We made four experiments on them, giving $\frac{1}{25}$th, $\frac{1}{17}$th, and $\frac{1}{12}$th of a grain of the alkaloid, but without producing any aggravation of the movements.

Samson took steadily one minim of liquor strychniæ three times a day till the present time, June, and has greatly improved. Whereas previously he always kept his bed, because on sitting up the movements became intolerable, he now sits up daily, and can walk with comparative ease. The movements are much less marked, and he has far greater control over both the hand and arm.

It will be observed that this case confirms most of the conclusions arrived at by my colleague, Dr. Gowers, and recorded in his excellent paper. It differs however in some respects. As in his cases, voluntary effort increased the spasm. An effort to overcome the spasm by passive force increased it; it ceased during sleep, at all events latterly. But unlike Dr. Gowers' cases, in this man the affection was certainly equally severe, if not more severe, in the leg than in the arm, and no paralysis remained in this member. Warmth increased the spasms.

Charcot says that closure of the eyes does not increase the spasm, but with this patient the contrary happened. The case, however, accorded with Charcot's experience in being associated in the earlier part of its course with hemi-anæsthesia.

*Seat and Nature of the Disease.*—Dazzling before the eyes, dimness of sight, giddiness preceding loss of consciousness, and followed by loss of speech, and sensation and motion of the right side, point conclusively to the left hemisphere of the cerebrum as the seat of disease. The giddiness indicates the mesencephale, the loss of speech the posterior part of the third frontal convolution, the loss of sensation the thalamus opticus, and the loss of motion the corpus striatum, as the parts probably affected. As speech returned before sensation, and sensation before voluntary motion, the main stress of the disease must have fallen on the corpus striatum, and in a less degree on the thalamus opticus. It is probable, I think, that the cause of the attack was an embolon, set free from the diseased mitral valves, blocking the middle cerebral artery.

When the patient came under our care the chief effects of the disease had passed away; or rather they had undergone a complete change; for instead of paralysis we had in its stead a state of "mobile spasm," dependent on change in the corpus striatum, or thalamus opticus, but probably on the corpus striatum. It is highly improbable, I think, that the disease is situated in the "cortical centres" of Ferrier, but with more likelihood, as I have said, in the automatic centres at the base, for emotional stimuli, automatic movements, like walking, buttoning the wristband, &c., and purely reflex stimuli, all produce the spasms.

I may next remark that the disease does not imply destruction of function, there being no paralysis, but rather a perversion of function.

In this case we have the following four circumstances to consider:

1. There is, when awake, continuous evolution of force.
2. Incoordinate action.
3. Excessive evolution of force from normal stimuli of will emotion, and reflex irritation.
4. This evolution of force is produced by stimuli which normally ought not at all to affect this part of the nervous system.

What is the nature of the change in this automatic centre? The most striking symptom is incoordinated action. Any stimulus originating either in the will or in the emotional centres no longer calls forth a definite and coordinated act, but on many occasions, and always, after a time, an utterly purposeless act. Yet it is something more than a mere incoordination; for assuming that for every complex combination of muscular contraction there is a coordinating centre, the disease does not consist merely of a destruction or weakening of some of these centres, for then we should get only irregular (incoordinated) action of the muscles set in motion by the voluntary act, but in addition to these many other muscles became powerfully affected; muscles even in the limb not set in motion by the will. Thus the stimulus, whether voluntary or emotional, does not run along definite channels, but radiates in all directions throughout the diseased area of gray matter, producing disorderly movements; in other words, that force or condition of the nervous centres which restrains the discharge within certain definite areas of the gray matter is weakened, and, owing to this diminished resistance, the stimulus radiates into other parts, producing disorderly and widespread movements.[1]

As in the case of allied spasmodic diseases, as chorea, strange to say, stimuli directed to the diseased nervous tissue not only produce disorderly movements, but impressions directed to a wholly different part find their way to the diseased gray matter, and radiating throughout it, produce disorderly movements. For instance, a voluntary stimulus intended to contract a part of the healthy arm or leg is partly or even wholly diverted to the diseased portion, and sets free in it a nervous discharge instead of in the part it was intended for. In this case emotional stimuli were more diverted by the diseased gray matter than volitional. We may assume that in this case, through some defect in resistance, impressions are not restricted to their proper channels; but at some point where the resistance fails, the nervous force leaks out, finding its way to the diseased nervous structures connected with the right arm and leg.

Some eminent writers would I believe refer this evolution of force in the diseased nervous centre to higher nutrition reaching an explosive degree; and they would say that in Samson's case an ordinary volitional or emotional stimulus liberated an unusual amount of force, producing very powerful muscular contraction. It appears to me there are cogent objections to this view. We have seen that voluntary movement increases the incoordinated movement, and the longer the voluntary movement continues, the greater the incoordinated becomes, till at last incoordinated completely usurps coordinated movement. Now according to the foregoing theory, the voluntary movement should, so to speak, work off the higher nutrition, and keep it down below an explosive point, and the longer the persistence of the voluntary movement, the more the nutrition (potential force) is consumed, and the incoordinated should give way to coordinated action. On the supposition that the lesion has lessened and in some parts destroyed the resistance, the last described effect of voluntary movement is easy to explain. If depressed then, only by voluntary action it becomes still further depressed, and hence the impulse can more readily irradiate. The condition is comparable to that of the spinal cord of a frog to which a dose, only just sufficient to produce tetanus, has been given. On irritating a limb we produce at first only a coordinated reflex act, but by keeping up the reflex contraction of the leg this at last becomes tetanic. The strychnia has depressed resistance, though not enough to permit the onset of tetanus till resistance itself is still more depressed by the functional activity of the cord. If it is said, How then do you explain the excessive evolution of force, and consequently very powerful muscular contraction?—this I would explain by adducing a fact I have tried experimentally to prove in conjunction with Mr. Murrell, that the resistance not only localises, but restrains the amount of nervous discharge, and by weakening it we not only allow the irritation to irradiate, but also to set free an excessive amount of force.

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[1] This view coincides with the one advanced by Dr. Gowers in his paper. He says, "The slow, irregular spasm which occurs on movement is clearly due, in part, to a diversion of the motor impulse, along an unintended path, or its irradiation over a wider region than that to which it should have been confined."

Is any of the spasm in Samson's case due to the lesion which produced the loss of resistance? Does the lesion act as an excitor causing a perpetual discharge of force, or is all the spasm due to volitional, emotional, and reflex stimuli? In the early stage of the case, when the movements were violent during sleep, I suggest that the lesion acted as a stimulus, since it is evident that the movements could not be produced during sleep by the will or by the emotions. Latterly, and during the time he has been under our charge, the original lesion appears to play no part in the evolution of force, for the limbs are quiet during sleep. It is true he tells us that occasionally his arm or leg moves during sleep to wake him; but after careful watching we have never seen this; therefore it must occur but seldom, and I suggest that it is then due to the emotional excitement of a dream.

It seems to me that athetosis is allied to many diseases, with which at first sight it would appear to have little or no affinity. In athetosis, as we have seen, a change takes place in certain parts of the cerebrum, especially in the basal ganglia (optic-thalamus and corpus striatum), whereby a stimulus is not restrained to its normal portion of gray matter, but "radiates" into other parts, so that instead of coordinated we get incoordinated muscular contraction. In addition, stimuli destined for another part of the brain are diverted as it were to the diseased area; and hence the diseased area becomes excited by stimuli which naturally would exert no action on it. In the case of many other diseases we meet with precisely the same unrestrained action, due to lessening or destruction of the "resistance" in certain portions of the cerebral nervous system, so that impressions radiate beyond their normal sphere. Wherever this irradiation or loss of "resistance" occurs, the change causing it, I venture to assume, is identical, whatever the kind of disease leading to it; being in the present case probably embolism. If this view holds good it is obvious that athetosis becomes connected with many diseases manifesting symptoms widely different from those pertaining to athetosis itself. If the "loss of resistance," or in other words, the condition permitting "irradiation," is situated in parts connected with motor nerves, we get irregular incoordinated contraction of muscles; if with parts connected with sensory nerves, we get widespread pains. The persistence, remittence, or intermittence of the exciting cause will of course modify the symptoms. Thus if the exciting cause is permanent, then the muscular contraction or pain will be permanent; if remittent, the contraction or pain will be remittent; if intermittent, then also the contraction or pain will be intermittent.

Thus the name athetosis indicates the seat of the disease rather than its nature.

The constant slow movement due to the consecutive slow contraction and relaxation of different muscles can, I think, be explained in this wise: the loss of resistance being partial only, as soon as the evolution of force has reduced the potential force, the remaining resistance is adequate to restrain the irradiation, till nutrition has again restored and accumulated the potential force, so that the weakened resistance, unable longer to restrain the evolution of force within normal limits, contraction and relaxation of various muscles will then occur with consequent constant changes of the affected limb.

The similarity between athetosis and chorea is too evident to be dwelt on; so I will now attempt to show its affinity to diseases with which at first sight it would seem to have no relation. For example, it appears to me to be allied to stammering. In stammering, before the word can be uttered, there occurs, in mild cases, remittent and alternating spasm of the muscles surrounding the mouth; in more determined stammering almost all the muscles supplied by the seventh nerve are affected; in severer cases the neck muscles produce frequent spasmodical jerking of the head; whilst in very severe cases, in addition to all these muscular movements, there is frequent spasmodic heaving of the shoulders.

On analysing these movements, we find that the impulse, starting from the speech centre, instead of running at once in its proper channels, is diverted, and through loss of resistance radiates through the nucleus of the seventh, the irradiation being in mild cases slight, and involving that part only of the nucleus supplying the muscles surrounding the mouth. In more developed cases, however, irradiation takes place throughout the greater part of the nucleus of the seventh, and in still severer instances involving the thin gray matter in connection with nerves supplying some of the neck muscles, and reaching even the spinal accessory, causing spasmodic contraction of the trapezius and consequent heaving of the shoulders. As in athetosis, so in stammering, the muscles are not all simultaneously contracted, some being relaxed, whilst others are contracted. This state is not, of course, continuous like athetosis, for the simple reason that the exciting cause, speech, is itself intermittent; but I venture to think that the condition (the loss of resistance) permitting the irradiation is the same, only that it affects different parts, and stammering might therefore be called intermittent athetosis of the facial muscles.

I will give another illustrative example in the case of a man belonging to a family of stutterers, himself when young a notable stutterer. After a time the spasmodic movements of the face and of the head ceased, leaving in their stead a spasmodic shrugging of the right shoulder three or four times repeated before he could begin to speak, when the shoulder became quiet. Like ordinary stammering, the convulsion was much more marked, indeed was almost violent when he tried to pronounce C and Z. Whilst the shrugging was going on he meanwhile was obviously striving strenuously to get out the word or letter. Here, the defect permitting irradiation, the loss of resistance, at first extensive, gradually grew less; but instead of disappearing entirely, as in most cases, a remnant remained, the impulse generated in the act of speech irradiating to the nucleus of the *right* spinal accessory nerve.

Athetosis is allied also to painful spasmodic affections, as neuralgia. But here the irradiation occurs in a portion of the gray matter associated with sensory nerves. Indeed, in watching over a case of athetosis we were struck with its similarity to aneuralgia. Thus we might compare it to a case of sciatica. In sciatica there is often some persistent pain, and in our case there was some sustained spasm. In sciatica, in addition to the characteristic persistent pain, other pains shoot now through one branch of the nerve, now dart through another. So with athetosis; in addition to the sustained contraction we get likewise now contraction of one set of muscles, and these relaxing, then contraction of another set.

It may be objected that in athetosis the irradiation is comparatively tardy, as shown by the slow continuous movement, whilst in stammering it is far quicker, and in neuralgia is of lightning-like rapidity; and that this difference must imply a difference in the nature of the change permitting the irradiation. To this I may answer that the rapidity of movement varies greatly in athetosis, as shown in the cases reported by Dr. Gowers; in other diseases the rapidity with which the nervous discharge travels varies greatly; thus the aura of epilepsy and the allied aura in other nervous affections vary much in the rate of passage along the central nervous system, yet we do not therefore assume that the nature of the change in the nervous centres is different in kind.

# THE RESULTS OF A MINUTE EXAMINATION OF THE SPINAL CORD IN TWO CASES OF ACUTE TETANUS.

BY JAMES TYSON, M.D.,

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THE following cases are presented as a slight contribution to our knowledge of the lesions found in the spinal cord in this important and as yet imperfectly understood affection.

CASE I.—A lad, fourteen years of age, struck his head against a rock in the act of diving, causing an extensive scalp wound over the major part of the right parietal, and portion of the frontal bone. There was slight nervous disturbance and moderate fever for two or three days; but the wound did well, and from the third until the eighth day the boy seemed quite well. On the eighth day the peculiar *facies* appeared, and on the ninth day trismus set in, soon followed by the convulsions of tetanus. Death occurred on the twelfth day after the accident. For the facts of the clinical history, as well as the cord, I am indebted to Dr. Charles Cadwallader.

The part of the cord examined included that from the cervical enlargement to the *filum terminale.* Macroscopically it revealed nothing abnormal as to membranes or exterior, but on section there was evident softening from the upper extremity (cervical enlargement) to the lower end of the lumbar enlargement. It was less marked in the cervical swelling, but increased as the cord was descended, reaching its maximum degree at about the middle of the lumbar enlargement, where, and at a considerable distance on each side, the central part of the cord "welled" up above the level of the surrounding parts immediately after section as though released from restriction.

Microscopically, after hardening in alcohol, thin sections, carmine-tinted, were examined, from the cervical enlargement, from opposite the seventh dorsal nerve, and from the lumbar enlargement.

Sections from the *cervical* enlargement opposite the last cervical nerves showed the softened part to include the gray commissure, which was partially disintegrated. There was no central spinal canal in its proper place, but to the right of the centre of the gray commissure, at *a*, Fig. 1 (the drawings having been made with the camera lucida, the right side of the *object* is found at the left of the *picture*, and *vice versâ*, while the relations of anterior and posterior, or top and bottom, is not changed, as in a mirror), there appeared a collection of round cells, among which could be focussed elongated cells arranged in the arc of an ovoid. These were apparently the remnant of the columnar lining of the central canal; so that it would seem that the central canal, filled with a proliferated collection of cells, was pushed to the right of its original position. Directly posterior to this, at *b*, Fig. 1, lay a large extravasation of blood. Directly opposite to this, at *c c′*, in the left posterior column, lay two linear extravasations, probably the remains of a larger one which separated the substance of the cord, as shown in the drawing; and at *d* in the membranes dipping down into the anterior median fissure was a large capillary, choked with blood-corpuscles. The posterior columns were thoroughly disintegrated, as shown in the drawing, and there was no posterior median fissure.

The section through the *dorsal* part of the cord, opposite the seventh dorsal nerve, showed even more complete disintegration of the gray commissure, no trace of the central spinal canal being discoverable, nor any posterior median fissure. The fragmentary state of the commissure is shown in the middle of Fig. 2. The arterioles and capillaries (*a*, Fig. 2) of the cornu, both anterior and posterior, were choked with blood-corpuscles, which were also extravasated, separating the elements of the columns. The membranes reflected into the anterior median fissure carried a larger arteriole (*b*, Fig. 2), which extended through the right anterior column to the corresponding cornu;

this, with its branching capillaries, was choked with blood-corpuscles. To a less extent this choking was true of the vessels of the posterior columns, which maintained their continuity in this cut.

*Fig.1.*

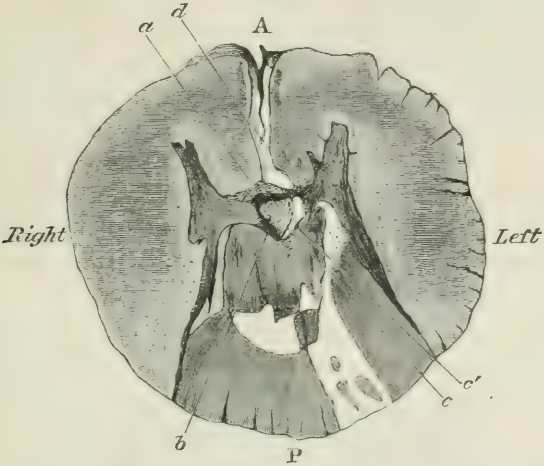
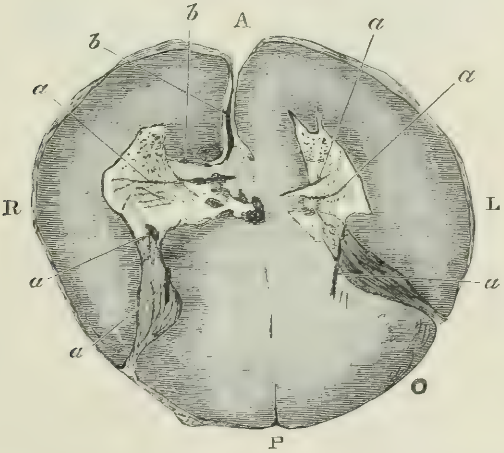


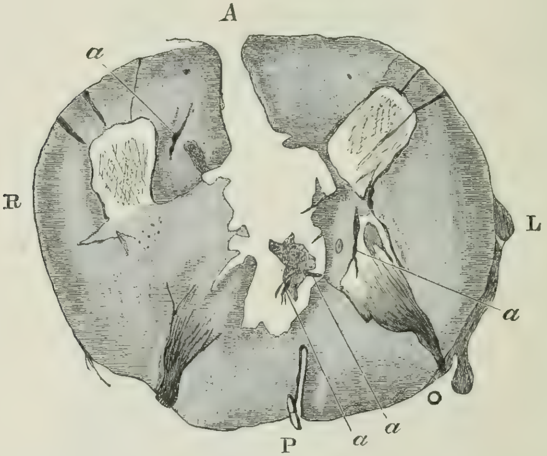
*Fig.2.*



The section through the *lumbar enlargement* showed the same destruction of the gray commissure, which had here completely disappeared (see Fig. 3), together with parts of the anterior and posterior columns. Similar blood-distended arterioles indicated by *a* in Fig. 3 were also present. The posterior median fissure was partially preserved.

Case II.—A lad, aged seventeen years, was admitted to the Hospital of the University of Pennsylvania, January 12, 1877, with frost-bite of both feet. When admitted, the line of demarcation had formed in each foot. Symptoms of tetanus first appeared January 15, and the next day tetanic convulsions were frequent and severe. Nitrite of amyl was inhaled with the effect of decidedly relaxing the spasms. Hypodermic injections of woorara were administered in doses of three-quarters of a grain every three-quarters of an hour without advantage, and the patient died on the afternoon of January 17.

*Fig. 3.*



At the *autopsy* the dorsal and lumbar portions of the cord were removed. There was marked venous congestion of the membranes of the cord and of the lining of the canal.

Sections from the *lumbar* enlargement of the cord, carmine-tinted, exhibited decided disintegration of the posterior column, including all that part between the posterior cornua from the periphery to the central canal, the posterior wall of which was partially broken down. The degree of softening increased progressively from the periphery towards the centre, a short distance posterior to which the destruction was complete, all the elements of the cord being lost. Towards the periphery, where the softening was less advanced, the neuroglia remained with its corpuscles markedly distinct. There was no extravasation of blood, nor did the capillaries and arterioles appear distended with blood-corpuscles.

REMARKS.—It will be seen from the above reports that examination of the cord in two cases of undoubted acute tetanus revealed softening of the posterior columns. In one instance this was attended by blood extravasation chiefly in these columns of the cord, but to some extent also in the vessels of the pia mater, also by destruction of the central gray commissure. In the second case no extravasations were found in the posterior columns, but the macroscopic examination revealed venous congestion of the external membranes (dura mater) and lining of the canal.

If these results are compared with the numerous lesions associated with tetanus, as collected by Dr. E. L. Ford in his work on *The Pathological Anatomy of the Nerve Centres*, it will be seen that they add to rather than diminish the uncertainty already existing as to the pathology of this affection, and justify the suggestion already acted upon, that future investigations should be directed to the peripheral nerves extending from the seat of injury to the nerve-centres, as well as to these centres themselves.

The changes alluded to as collected by Dr. Ford are the following :—

1. Proliferation of the neuroglia amounting to sclerosis, traced from the peripheral nerves to the posterior columns of the spinal cord, and considered secondary (Rokitansky and Demne).
2. Granular degeneration of the cells of the cord (Lockhart Clarke).
3. Inflammation of the neurilemma (Lepelletier and Froriep).
4. Collection of fat between membranes and cord.
5. Softened patch in the cord just above the cauda equina.
6. Effusion of blood outside the dura mater about the seventh or eighth dorsal vertebra, and a softening of the cord in the dorsal region.
7. Effusions of serum into the spinal membranes, and even hæmorrhages, are not uncommon as results, and not as causes.

8. Nerve twig in the wound diseased (Erichsen, Poland, Trousseau).
9. Congestion, inflammation, exudation, softening, induration (Romberg).
10. In many cases no lesion whatever (Wilks and others).
11. Some lesions of the spinal membranes, or a little more liquid than usual in the membranes, or injections and even softening of the *anterior* columns of the cord (Sandras and Bourguignon).
12. Areas of disintegrations and extravasations of blood in different parts of the cord (L. Clarke, Dickenson, Allbut, and E. L. Fox).

In general terms the latter may be said to be the lesions in my own cases.

# ON THE STATE OF THERAPEUTICS IN TETANUS.

THE ancient treatment of tetanus was only palliative, and it was unsuccessful; so that the old writers, who give the first place to the common method of alleviating pain, bring up afterwards the drugs that they knew to act on the nervous system very much, with the honest courage of men who are not ashamed of showing all their strength when it is most overmatched. "Nor yet," says one of them, "can the physician standing by and looking on be now of any service to his patient to rescue him either from death or from pain, or from the shameful contortions of his disease. No longer of any assistance, he can only be sorry for him, as he sees him overcome."

Modern medicine, in despair for a specific, forgets that she is armed with a sheaf of weapons that would have made the ancients contented. In the attempt to cure we have arrived at alleviation, and at such complete alleviation as often to bring cure with it; and if we have accomplished nothing more, yet the step already made must encourage the highest hope. And that nothing more has been accomplished, a consideration of what has been done in different instances by these drugs will show.

To begin with chloroform. Certainly if tetanus were curable by chloroform we should all know it: its general use has ensured it a wide trial, and from the ease and quickness with which it can be introduced into the system, its effects are at first sight most brilliant, nor need it always, in order to relieve the muscular contraction and spasm, be pushed to narcotism. Under its influence the respiration becomes regular, the pulse infrequent, soft, and full, and this without giddiness, headache, or distress: it is even possible to feed the patient. Thus, Simpson narcotised a child for thirteen consecutive days, using ℥100 with success. But the general result is, that while all the fatal symptoms disappear upon the inhalation of chloroform, they return at its removal with unabated violence, and the disease generally comes then to its fatal conclusion without delay. A very good illustration of this may be found in a case reported by Dr. Panthel of Limburg, who used on the first day ℥vj. of chloroform without inconvenience, and yet after the most complete remission of all symptoms, in the end lost his patient, who died with a small, hard, and rapid pulse, inhaling chloroform and conscious.

Chloroform is now very rarely administered in tetanus, but chloral hydrate and calabar bean, the drugs which most nearly approach it in respect of physiological action, are much in favour. Innumerable cases of the action of chloral are reported. To make any digest of them would be impossible, but in reading them one becomes convinced of two facts:—the first, that large doses must be given, and may be given without fear; the second, that such a treatment is most valuable. In the *Progrès Méd.* of July, 1875, there is a successful case reported in which the character of the disease was almost masked by the treatment, which was of a decidedly heroic nature, the daily dose of chloral being 155 grains, and intoxication being well marked. In the same paper reference is made to cases of death from overdose of chloral, which however are declared to be rare, and as an indication of the quantity that may be given the case is quoted of a child of twelve and a half years who took more than 200 grains a day. Dr. Ballantyne, of Dalkeith, gave ℥iij. in twenty-four hours, and ℥vj. ss. in three weeks with success; the patient during this time being easily aroused to speak. Other and similar cases are well known; unsuccessful ones will be found in *Bull. Gén. de Thérap.*, June, 1874, and in 1875 Alphonse Deu in a traumatic case gave as much as 150 grains a day without good result.

In 1872 chloral was injected into the veins by Dr. Oré, who, though unsuccessful, vaunted his method. In 1874 it was tried by Cruveilhier (*Gazette des Hôp.*, No. 49), who also failed, and recommended that a solution containing one-fifth in place of one-third should be used. Later on in the same year Lannelongue (*Gaz. des Hôp.* No. 125), using one-fifth, practised with the same result, and in the *post-mortem* examination found thromboses in the injected veins and clots in the right heart. In 1874 the Medical Theatre at Paris rang with denunciations of Dr. Oré, whose method died finally on May 13, 1874, in the presence of the Surgical Society of Paris, defended by its author to the last. It appears that in the subcutaneous injection of chloral, which has also been practised, a strength exceeding one-third injures the skin.

Calabar bean, which, like chloral, affects the spinal cord, and has little or no action on the motor and sensory nerves, has also, like chloral, a high and well-deserved reputation. Eilert in 1873 (*Zur Frage von der Behandlung des Wundstarrkrampfes*) pretends that of opium, chloroform, chloral, curare and Calabar bean, the latter is the only one that acts satisfactorily on the spinal cord. He recommends either previous narcotism by chloral, or the simultaneous administration of atropin, so that both of these combinations have probably been tried. Already in 1864 Holthouse had reported two cases in the *Lancet*, one successful; he used three grains of the extract every two hours, and once 4½ grains in one dose. Maunder added two unsuccessful cases, and in 1867 Dr. Eben Watson reported two traumatic cases, which recovered, in the *Edin. Med. Journ.*; he had given by accident nine grains in as many hours. He also narrates his experience of the bean in Calabar, and gives ten experiments on animals; later he reported six of eight cases successful. Dr. Fraser in 1868 (*Practitioner*), urging the trial of the bean, which has since been largely used, gives a history of its use, with a list of cases. But Mr. Ashdown (*Brit. Med. Journ.*) in the same year had a case in which the drug seemed to fail, and Professor Spence, in the *Lancet* of January, 1875, reported another unsuccessful case, in which a boy of eighteen took twenty-two grains of the extract in 3½ days, and died on the fourth day. In last year's *Lancet* there are three cases by Dr. Dickenson, one of which died after having had about seven grains of the extract injected subcutaneously in the course of an afternoon without cessation of the spasms being procured: while of the two successful cases one was of an idiopathic, and the other a protracted nature.

The effect of the bean seems to be all that one would expect from its known properties; and that it is indicated the large doses requisite to obtain its physiological action seem to prove. The spasms are controlled and the body heat sinks, and if the drug be withheld the paroxysms return, while if it be pressed the patient comes into a somewhat dangerous condition. Those who have used it recommend its hypodermic injection, not less than $\frac{1}{3}$ grain of the extract every two hours, and so large a dose is required to procure contraction of the pupil that it has even been seriously contended that its effect in subcutaneous injection is to dilate it. From the reported cases it seems as if the first injection of Calabar bean or of curare sometimes produced a spasm.

Opium combined with chloral has been often successful. In 1874 Delsol reported three cases out of four saved by this plan; but in most of the printed cases the chloral is given in such predominance as to claim more than half the merit of the cure. A fatal case will be found in *Progrès Méd.*, July, 1875. Alcoholic cases have been treated successfully by opium alone; and that the drug is not contra-indicated may be learned from Dr. Avemollo, who in *L'Imparziale* (Florence) of December, 1868, is said to have given successfully in the course of eleven days eighty-five grains of the extract and one ounce of the tincture of opium, and five grains of acetate of morphia, besides vast quantities of belladonna, assafetida, hyoscyamus, and camphor.

Nitrite of amyl, which, like the three first-mentioned drugs, lessens the reflex action of the spinal cord, and has no action on the motor and sensory nerves, but, unlike them, excites the circulation, has been tried and failed. The first reported cases were of course the successful ones, Mr. Foster in the *Lancet*, April, 1870, and another in the *Berlin. klin. Wochenschrift* of January, 1875. But, in 1874, Forbes (*Philad. Med. and Surg. Rep.*) reports that the attacks were only rendered milder by the medicine, and returned severely on leaving it off; and the *British Med. Jour.* of the same year contains a fatal case.

Bromide of potassium, combined with chloral, was used successfully by both Drs. Panthel and Carruthers in 1874, but the chloral was given in large doses. In Carruthers' case a boy took 1,140 grains of chloral in sixteen days, and subsequently had a sort of *mania a potu.* It seems doubtful whether the administration of bromide of potassium alone has ever been successful in severe cases. Robert Brown has a case in which he gave 20 grains hourly for fourteen days, but was not able to prevent the spasms, while stiffness of the muscles continued long into convalescence; and a case is to be found in the *Prog. Med.*, July, 1875, which ended fatally, notwithstanding that the patient took 150 grains a day.

Of conium, the action of which is said to be confined to the spinal cord and motor nerves, no results worthy of such premises are found. The cases in which it has seemed successful have been slight ones, and the drug appears to be inert even in large quantities.

Of aconite some very remarkable results have been given. The first instance of its use occurs in 1846, in a case of Mr. Page (*Lancet*, April 4). This case, which is well known, was traumatic; there was a remission of all symptoms after a three-minim dose, then recurrence of symptoms, and with the repetition of the medicine chilliness, cold skin, and clammy sweat; pulse 120, weak and intermittent. The antidotes used were wine and opium. The treatment seemed to consist in a balancing of the patient between tetanus and syncope. Then in 1859 Campbell de Morgan had a successful case, not a very severe one. The patient took ʒiij. of the pharmacopœial, and ʒv. of Fleming's tincture, that is, about ʒxiij. of B.P. strength, without damage; and in 1860 a case in the *Brit. Med. Journ.* confirms the other two. Aconite when administered in tetanus will lower the pulse, which fell in one case from 135 to 60, and simultaneously the convulsions decrease, and the muscular contractions are relaxed; but the effects of the drug constitute in themselves a new danger, which must be carefully and skilfully controlled. The wakefulness is increased; there is vertigo with confusion of ideas; the pupil, which is widely dilated, becomes insensible; and the pulse small, intermittent, and irregular. In one case the state of the patient was such that the slightest jar set up spasm, similar to that in strychnia poisoning. On the whole these cases remind one of acute disease treated by tartar emetic, and tetanus itself has been successfully treated by large doses of this unfashionable salt.

Curare, which came from England, was first used in Italy by Vella in 1859. Two of his three cases were in the stage of asphyxia before he administered it; the third was unusually severe; all three were fatal. But Cassaignac (*Gaz. des Hôp.*) in the same year was successful. The drug, however, seems to have got a bad name, and has never recovered from it, in spite of the successful cases reported in 1873 by Stoffani, and in 1874 by Angelo Ghio and Carlo Lauri. In 1865 there is a report in the *Bull. de Thérap.* on curare which coincides with Eilert's summary in 1873. It is uncertain, always dangerous, and in most cases useless. Since it is the strongest of all our drugs as depressor of the motor nerves, and has no action on the spinal cord, the comparison of its effect with that of chloral is valuable. There does not seem to be any record of a trial of curare in combination with drugs that would supplement its action.

Belladonna, save that it excites the cord, is nearest in its action to curare. Gosselin, who failed with curare (*Gaz. des Hôp.*, 1860), failed with it also: and Benoit (*Bull. de Thér.*, September, 1860), pushed it to intoxication and failed, not even relieving the stiffness of the muscles. On the other hand, Peschaux in the same year reported a successful case to the Surgical Society of Paris, having injected a solution of $\frac{1}{100}$ of atropine into different parts of the body; and Fournier (*Gaz. des Hôp.*, 1860), produced intoxication by subcutaneous injection, and saved his patient.

Strychnia, to which homœopathy would point, brought a strong recommendation from America; but Campbell de Morgan (*Brit. and For. Med. Chir. Rev.*, 59) tried it without finding it of any service. It increased, as one would suppose, the symptoms of tetanus, and put the patient in danger of death by asphyxia.

No special action has been made out for Cannabis Indica in tetanus; though used in large doses, it has failed in many cases, and has been unable to win any credit when the patient has recovered, and if one mentions this drug one should not omit alcohol, which has apparently been used successfully, and with effects that are worth recording. For Betoli (*Ann. Univ.*, 1859), who says that he kept his patient in a sort of drunkenness, affirms that the wits were strangely untouched, and that there was neither headache nor giddiness. Mr. Williams too who prescribed at the rate of eight dozen of port a month, and Dr. Jlott, who administered two gallons of schnapps in a week, seem to have had nothing to regret.

Neurotomy, tenotomy and amputation are beyond the purpose of this paper, and for the consideration of the use of cold applications to the spine, sufficient materials seem to be wanting. Carpenter in the *New York Journal*, 1860 (this reference is not verified), states that he cured 16 out of 17 cases by this plan, and the ether spray to the back has been reported of use. The great difficulty of making use of this method is obviated by the use of chloral, which if given in sufficient doses might be generally relied on to render the patient tolerant of the treatment.

It has been the purpose of this short paper to sketch out briefly, with reference to a few selected instances, the history of the success and failure of these powerful drugs, in the belief that such a summary makes an appeal to pathology to throw fresh light on the nature of this disease ; for experiment, long on the track of discovery, seems now at fault, and asks for a better knowledge of the conditions to be met, not without a hope that some combination of these agents may be indicated which will perform what each one of them singly has been found unable to accomplish.

# Reviews.

*A Practical Treatise on Fractures and Dislocations.* By FRANK HASTINGS HAMILTON, M.D., New York. London: Smith, Elder and Co.

IN the preface to the first edition of this work, published in New York in 1859, Dr. Hamilton stated that he had been led to undertake it because the English language did not contain a single complete treatise on fractures and dislocations. In the seventeen years that have elapsed since that time the book has run through five editions, and is now published in England—a proof that it is not only popular in America, but much appreciated here. The favour with which it has been received it has fairly earned: it deserves a high place in the surgical literature of the day. A further quotation from his preface will show the spirit which has guided the author in his task. "It is apparent (he says) that if we would make surgery an exact science we must apply to its study the same exact rules which are alone employed successfully in the study of other sciences. Every false or loose statement retards our progress and renders our steps hesitating and unequal." This is a view of the matter that we may usefully commend to the notice of not a few who have already written on surgery, and to all who may intend to do so. Dr. Hamilton's intimate knowledge of European surgical literature is remarkable: not less so is the judicial impartiality with which he collates and sifts the statements and the opinions of various writers, or the labour and care with which he assesses the respective values of the different museum specimens which the celebrated men of fifty years ago depended on to prove their favourite doctrines respecting particular fractures and dislocations. Some may think that Dr. Hamilton has cumbered his pages by over-long discussions and by too many quotations from other writers, and has thus diminished the value of his book as a volume for easy reference. But this is, so far as it exists, a drawback that could not be avoided if the treatise were to be full and complete. The work is copiously illustrated by wood-cuts, the majority of which are very good and many excellent. The chapter on fractures of the femur contains no less than seventy-six. No doubt many of these represent methods of treatment that are now out of fashion, and might have therefore been ignored; but their introduction at least enables surgeons to see at a glance what has been already done, and thus to gain a useful stand-point for future work. The author caters for the taste of all by describing eight methods of putting up fractures of the femur, himself preferring extension by weight and pully, short splints surrounding the fracture, and a Liston's long splint to give stability to the limb. Eight methods for putting up fractured clavicle are also given, the author's own being by an axillary pad, and bandages, one to support the elbow, the other to keep the arm to the side and the forearm across the chest—a scheme, as he remarks, corresponding with that commonly employed at present in many London hospitals. His chapters on dislocations, especially that on reduction by manipulation, are both interesting and highly valuable. In conclusion, we have only space left to add that the work is worthy of all the popularity we anticipate for it in its English garb.

*A Manual of General Pathology for the Use of Students and Practitioners of Medicine.* By ERNST WAGNER. Translated from the Sixth German Edition by John Van Duyn and E. C. Seguin. London: Sampson Low, 1876. Pp. 728.

THIS closely-printed volume is an acceptable reproduction of the well-known treatise by the Professor of Pathology at Leipsig. The first edition, published in 1862, was the joint work of Wagner and of Uhle, of whom the latter died before its publication. Each edition has as usual been larger than its predecessor—a seventh has lately appeared—but by help of good indices, clear arrangement, and the use of variety of print, the present volume is more manageable than its size would lead one to suppose.

The first part, on General Nosology, is comparatively commonplace. In speaking of the simultaneous occurrence of diseases, Professor Wagner says that scarlet and typhoid fevers often occur together, which is not English experience, and that scarlatina and angina are concomitants, which seems an unnecessary statement. The best part of this section is that on the signs of death, where, however, the odd remark occurs that putrefaction is not a sign but a consequence of death, as if a cardiac murmur ceased to be a sign of valvular disease because it is its consequence.

The next part, on Etiology, is full of valuable matter. The differences of liability to disease which depends upon age and sex are fully discussed, and this section ends as follows:—

"In all disease women endure better than men. Severe pain, great loss of blood, continued ill health, exhaust men quicker than women. As regards their relations with physicians, women (apart from the insufferable pranks of hysterical ones) are more patient, tractable, and thankful than men."

The following section, on Constitution, Habit and Temperament as causes of disease is little more than an expression of belief in the existence or at least in the practical bearing of the ancient distinctions known by these names. Atmospheric influences, houses, clothing, &c., are next treated in a summary manner. A careful account of microphyta, arranged on Cohn's system, and of parasitic plants and animals follows. Among the latter Lewis's Filaria sanguinis has not been included, though its discovery was announced in 1872. The rarity of tapeworms in infants should have been ascribed to the absence of cystic entozoa in their food, and the worm referred to as due to want of cleanliness is oxyuris not ascaris.

The third part is much more important than the first two, and occupies half the entire book. In it the several morbid processes are discussed—Anæmia, Thrombosis, Hæmorrhage, and Dropsy, Inflammation, the various forms of Degeneration and Atrophy, and New Growths. Comparing these chapters with the first volume of Rokitansky's great work, we see how great an advance has been made since he acted as pioneer, chiefly by the labours of the illustrious Virchow, but only in a less degree by those of Billroth, Rindfleisch, Klebs, and many others in Germany, by Ranvier in France, and by Wilks and the many younger contributors to the *Pathological Transactions,* in England. One excellent feature of this part of the work is the arrangement of the growth of the several tissues along with the tumours which conform to their structure. The classification of tumours is essentially that of Virchow's *Krankhafte Geschwülste,* but as the chapter on Carcinoma has not yet appeared to complete that work, we may here give Wagner's classification of cancerous growths. After Lymphoma (lymphadenoma and lymphosarcoma, heteroplastic formations of cytogenic tissue) and Adenoma (new formation of glandular tissue) comes CANCER or CARCINOMA, defined by its course and clinical features. The following scale in frequency of the organs attacked by primary cancer is remarkable for the low position given to the rectum and the testis and the high one to the brain.

"First the female mamma, lower half of uterus with vagina, lower lip, stomach, œsophagus, lymph-glands; then, the skin, liver, intestines, bones, bladder, kidneys, brain and meninges, testicle, eye; last, the ovaries, lungs, air-passages, serous membranes, thyroid, salivary glands, lymphatic vessels."

## VARIETIES OF CANCER.

### I. EPITHELIAL CANCER (Epithelioma, cancroid).

1. *Pavement-cell cancer* (epithelial cancer or cancroid in the narrower sense), including as varieties the papillary or warty, the cicatricial (=rodent ulcer) and the mucous or gelatinous forms, and especially liable to fatty and to horny degeneration.
2. *Cylinder-cell cancer*, including villous cancer (in addition to the preceding) as a variety, and especially liable to fatty and mucous degeneration.
3. *Glandular-cell cancer*, under which would be included many transitional forms to pure adenomata, as Griesinger's and Rindfleisch's adenoid of the liver.

Colloid cancer is regarded as a degeneration of other forms.

### II. ENDOTHELIAL CANCER.

Arising through increase of endothelium of the lymphatic vessels in the skin, serous membranes, and sometimes other organs. The author does not admit Recklinghausen's and Köster's extension of this origin to other epithelial cancers.

### III. CONNECTIVE-TISSUE CANCER.

1. The hard form (scirrhus, carcinoma fibrosum).
2. The soft form (medullary, encephaloid, soft lympho-sarcoma).

The account of Tubercle is very full, and is brought up to the last results obtained by German and other pathologists.

The theories of Inflammation are also clearly stated and criticised. The controversy between Virchow, with his followers Recklinghausen, Stricker, Klein, and Sanderson on the one hand, and the school of Waller, Cohnheim, and Axel Key on the other, is carefully stated, and the result left undecided, unless we admit that inflammatory corpuscles may arise in two ways, by migration of leucocytes, and also by proliferation of tissue-elements.

The fourth and last part of this book, which has been added only in the later German editions, is not less valuable than the third. It is devoted to the pathology of the Blood. The section on Fever may be especially referred to as giving a synopsis of past and present views on this important subject, which can scarcely be found elsewhere. In the chapter on Leuchæmia, the American editors have "taken the liberty of placing J. H. Bennett's work at the head of the list 'of authorities.'" There are probably few who have studied the question who would not consider this liberty unwarranted. To Bennett, and to Piorry before him, belongs the merit of describing each a case of sphenic leuchæmia, which they misinterpreted. To Virchow, who published his first paper a month later than Professor Bennett, belongs the merit of having correctly understood the meaning of the cases he recorded, and of putting the disease in the position it has ever since occupied. On the other hand, the common error of supposing that Biermer first described "progressive pernicious anæmia," which was accurately delineated and named "idiopathic anæmia" by Thomas Addison twenty years before, is committed by the author and not corrected by the editors of this work. We can only refer to the admirable sections in this fourth part on Pyæmia (pp. 586-602) and on Temperature in Disease (pp. 603-616).

The translators, Professors Seguin and Van Duyn deserve the thanks of all English readers for accomplishing so laborious and so important a task. They say "we have endeavoured to be literal and at the same time clear, and elegance of style has not been aimed at." In this they have succeeded: the translation is literal and clear, and is not elegant. We need not notice such incorrect expressions as "fungic" for fungous, "offset" for counterbalanced, and "defectious" for defective; nor the retention of the German affectation of prefixing "so-called" to well-known terms, nor such expressions as "claim" (used intransitively), "represented by," and so on. But here and there even clearness is sacrificed as well as elegance: *e.g.* "fundamental tissue" for ground-substance or matrix, "hiccough" for whooping-cough (an obvious mistranslation), "deficient nutrition produced by albumen or by water" (meaning by want of food), "once again" for "twice" as frequent, and the sentence, "Here we have, especially for the laity, three different modes of death."

These blemishes, however, do not detract from the solid value of the work, which is the fullest text-book of general pathology in the language.

### *Guide Pratique d'Electrothérapie.* By Dr. ONIMUS. Paris: 1877.

THE first part of the work treats of galvanic and faradic apparatus, and is well illustrated. The author develops his views as to the best form of medical elements. We must, however, confess ourselves unable to follow him when he speaks of the "chemical action" of a battery as something separable from the actual current strength. Physically, it seems impossible. Whether, physiologically, currents of the same strength, but from different cells, can be distinguished has never yet been satisfactorily proved. His practical remarks, on the other hand, are of the highest value. He writes a very good chapter on the difference of action between the faradic and galvanic currents; and, against Duchenne, shows that they are fundamentally different; the former acting only mechanically, the latter chemically. He lays great stress on the current of polarization set up in the tissues themselves. The author does not recommend protracted applications of the current. In the therapeutical divisions of the book he clearly states under every diseas what he considers to be the desirable dose of electricity to be administered, the direction of currents to be used (a very important point in his view), and the position of the rheophores. This will be of the greatest use to the bulk of practitioners who, above all, want clear and definite rules for the application of this as of every other therapeutical agent. We regret, however, that the author, who indicates the number of elements of his own battery as a measure of the current strength to be used in each instance, has not given, for the benefit of those who use different kinds of elements, a table of reduction; thus, for instance, where he mentions thirty elements it will be found that twenty Leclanche's or fifty Smee's will be necessary. The usefulness of electricity in muscular and nervous disease is universally acknowledged. We can recommend, with Dr. Onimus, its application to many disturbances of the digestive and genito-urinary organs.

The author writes a very useful chapter on electrolysis, of which he has had much favourable experience. The work concludes with a description of apparatus for galvano-caustic purposes.

We are convinced Dr. Onimus' little book will do good service in the cause of electro-therapeutics.

*The Endemic Diseases of Tropical Climates, with their Treatments.* By JOHN SULLIVAN, M.D., M.R.C.P., &c. London: J. and A. Churchill, 1877, pp. 211.

IN dealing with any medical subject, it is always a comfort to turn from a book containing many theories to one which deals almost entirely with the data derived from practice. This little book belongs to the latter class. The author has spent many years in Havana, and had numerous opportunities of treating the various endemic diseases met with in tropical climates. The results of his experience are given simply and briefly. He here treats of anæmia, marsh malarial fever, latent or masked malaria, pernicious fever, bilious fever of the tropics, marsh diathesis, and marsh cachexia, acute and chronic dystentery, diseases of the liver, hepatitis, jaundice, yellow fever, and Asiatic cholera. The chapter on latent or masked malaria is very interesting, and the cases given appear to show that diseases which at first sight would appear to be entirely unconnected with malaria may really have a malarious origin. Space forbids our giving an analysis of the work, but it is one which will well repay perusal.

# Clinic of the Month.

**Action of Drugs on the Biliary Secretion of the Dog.**—Dr. Rutherford and Dr. Vignal continue the account of their experiments with various drugs. They found in regard to *Ipecacuanha* that 60 grains, powdered, and mixed with a small quantity of bile and placed in the duodenum, powerfully stimulated the liver. Even three grains had an effect on a dog weighing about fifteen pounds. The bile secreted under its influence was of normal composition as regards the biliary matter proper. No purgative effect was produced, but there was an increased secretion of mucus in the small intestine. The composition of the bile did not afford any evidence of an increased secretion of mucus having taken place from the glands of the bile ducts. In regard to *Colocynth,* they found that it is an hepatic stimulant of considerable power; it renders the bile more watery, but nevertheless increases the secretion of biliary matter. It is also a powerful stimulant of the intestinal glands. In regard to *sodium sulphate,* doses of 60 grains twice repeated and a single dose of 508 grains increased the biliary secretion; *magnesium sulphate* has no cholagogue action. *Potassium sulphate* is undoubtedly an hepatic stimulant; *sodium phosphate* is an hepatic stimulant of very considerable power. Although it renders the bile more watery, it increases the amount of biliary matter secreted in unit of bile. While acting as a purgative it irritates the intestinal mucous membrane very slightly. *Rochelle salt* is certainly an hepatic stimulant, though probably not a powerful one in man. (*Brit. Med. Journ.* June 9, 1877.)

**The Use of Peroxide of Hydrogen for the Prevention of the Spread of Scarlet Fever and Smallpox.**—Dr. John Day, by request of the Mayor of Melbourne, in October, 1875, drew up a report, which was subsequently published by order of the Local Board of Health, on fifty-one cases of scarlet fever which had been treated by him between April, 1873, and April, 1875. These comprised all the cases of scarlet fever which had come under his charge during that period. They were all treated in a similar manner. Each patient was freely rubbed over the whole surface of the body three times a day with a preparation composed of one part of ethereal solution of peroxide of hydrogen (erroneously called ozonic ether) and seven parts of pure lard, well incorporated without the aid of heat. The inunctions were continued for about three weeks. No other remedies were prescribed, except in a few cases where the throat symptoms were severe, when a gargle, composed of two drachms of ozonic ether in eight ounces of water, was ordered to be used every second hour. These fifty-one cases occurred in thirty-eight different houses, and in four houses only was there any extension of the disease. There were no deaths. Since the above-named period Dr. Day has attended sixty-four cases, occurring in fifty different houses, and in three houses only was there any extension of the disease after he had commenced his treatment. He had been less fortunate, however, in his results, having had six deaths. Peroxide of hydrogen contains a larger amount of oxygen than any other known substance, and moreover one-half of its oxygen is loosely combined and in a highly active condition, ready to combine with any organic matter with which it may be brought in contact: so that it would appear to be an agent specially suited for the destruction of the poison-germs of scarlet fever, small-pox, and other epidemic diseases. Dr. Day has recently slightly modified his formula for the external application, and now generally prescribes it as follows:—Ozonic ether, four drachms; pure lard, four ounces; benzoic acid, twenty grains; otto of roses, four drops, to be carefully mixed without the aid of heat. The benzoic acid, in addition to its being a powerful antiseptic, possesses the property of allaying cutaneous irritation, a symptom often very distressing to scarlet fever patients. The otto of roses gives an agreeable odour to the preparation. He also prescribes throughout the whole course of the disease a mixture composed of two or three drachms of ozonic ether in half-a-pint of water; the dose ranging from a teaspoonful for a child twelve months old, to a tablespoonful for an adult, to be taken every second hour. This is used for the double purpose of benefiting the throat symptoms and disinfecting the breath. Dr. Day has so much faith in the disinfecting properties of peroxide of hydrogen that he recommends all his friends and patients who are in a position to afford it, to use freely that which, for want of a better name, he calls oxygenated perfumery. It is made by adding ozonic ether, in the proportion of about a drachm to the ounce, to any kind of perfume, according to individual taste. He gives the preference either to Rimmel's toilet vinegar or eau de Cologne. Letters, newspapers, and articles of clothing may be disinfected by sprinkling them over with oxygenated eau de Cologne or with any other oxygenated perfume. From a theoretical point of view it might be supposed that peroxide of hydrogen would act more powerfully as a disinfectant in small-pox than in scarlet fever in consequence of the curious property that pus-cells possess of exalting its chemical activity and giving it the oxidising powers of ozone. (*Medical Times and Gazette,* March 10th, 1877.)

**The Discrimination and Treatment of Neuralgia.**—Dr. Churton, of Leeds, states that he has for several years used a simple and ready method of discovering whether stimulants and tonics, or whether alkalies and aperients would be more likely to cure any given case of facial or dental neuralgia. The patient is first directed to hold warm water in his mouth, or to otherwise apply warmth to the seat of pain; and if little or no relief is thus gained, but especially if, as often happens, the pain is actually intensified, then to employ cold water in a similar way. If the cold water relieve the pain, this is regarded as being chiefly due to impurity of blood; and he has always found that it is relieved with certainty by magnesia and dieting. If, on the contrary, warmth relieve the pain very distinctly, then tonics, varying as the locality (district), constitution of patient, and precise causation, are surely indicated, and will, if in sufficient doses and combined (when necessary) with sedatives, remove—for a time at least, but often altogether—the insufferable pain. Many cases have occurred in which patients, at first resolutely bent upon having one or more teeth extracted, have been enabled to retain them for years simply by putting in practice this test and its associated treatment. There are some cases of neuralgia in overworked persons in which both plans of treatment are required. A man catches cold and has hemicrania. He is better out of doors; but, upon entering a warm room, is shortly in unendurable pain, especially about one eye, which becomes congested and tear-streaming. A single large dose of magnesian aperient, followed by ten or fifteen grain doses of ammonium chloride in infusion of bark, will remove this condition. Again the same patient may at one time require the magnesia plan, and at another time the tonic and stimulant plan for pain in the self-same nerve, this difference being shown, and the proper method suggested, by the altered effect of cold and heat; and it is probably the want of recognition of this fact which produces the apparent fickleness and uncertainty of any particular drug, such as phosphorus, guarana, quinine, &c. (*British Medical Journal,* April 7, 1877.)

**Collodion Flexile in Cases of Eczema.**—Dr. Henry Lawson, after commenting on the troublesome nature of cases of chronic eczema, and the unsatisfactory results of treatment of various kinds, states that in his hands in two bad cases of eczema, E. genitale and E. capitis—collodion has shown itself so valuable a remedial agent, that he desires to draw renewed attention to its value. He covers the parts with collodion and reapplies it twice daily. (*Lancet*, June 23, 1877.)

**Sawdust Pads as a Dressing.**—Mr. Callender states that Sir Joseph Fayrer having asked him to try Surgeon-Major Porter's plan of using sawdust pads as a dressing (Vide *Practitioner*, May 1877, p. 382) when there is a discharge of pus, he determined to test their value fully. The sawdust is obtained by preference from the Memel pine; that from the red deal may also be used, either of these containing a large amount of terebene. The dust from hard wood will not answer as it does not absorb freely. It must at first be sifted to remove large fragments, and the fine dust is then inclosed in muslin of such quality as will just prevent its escape. The bag is shaped according to the requirements of the case, and when three-fourths full is closed and quilted to prevent shifting of contents. The pads are applied either to side splints or to cover an ordinary back splint, as for a compound fracture of the leg, or over abscess wounds, or over suppuratory surfaces, or over dying or dead tissues. Mr. Callender gives the details of a number of cases in which successful application was made of pads so made, and states that the sisters of the wards in which they are used are satisfied with them on account of their cleanliness and for the manner in which they keep the bed-linen from being soiled by the discharge of serum or of pus. They are easily made to fit as required, and they are inexpensive. It is as well when the discharge is considerable to change the pads every two or three days, but when, in addition to the pad, carbolised oil dressing is used, they can be left for a longer period. Mixed with shot so as to give weight to the appliance, these pads may be used to make pressure when such is desirable, as over some forms of abscess, or to prevent redistension of an emptied sac. (*Lancet,* June 23.)

**The Administration of Phosphorus.**—Dr. S. M. Bradley, of Manchester, observes that the marvellous power which phosphorus possesses over trifacial neuralgia is likely to be doubted by many who prescribe the drug in the solid form of pills, since these generally pass through the system unchanged. Previous solution in tolu balsam, or other solvents, does not lessen this tendency, and to obtain the real action of the drug it must be given in the liquid form. Now there is no good pharmacopœial preparation of this invaluable drug, but the homœopaths prepare a solution of a fairly reliable and uniform strength of 1 per cent. Accordingly Dr. Bradley is now always in the habit of directing his patients who require phosphorus to take their prescription to a homœopathic chemist, who makes it up without demur. He writes in plain uncabalistic English, "One ounce of mother tincture (ethereal) 1 per per cent. in strength. Take two (or four up to eight) drops three times a day in water." (*British Medical Journal*, April 7, 1877.)

**Injection of Ammonia into the Veins in Collapse.**—Mr. F. C. Shaw states that he saw a patient under the care of Mr. Fitzgerald, of Melbourne, who two days previously was thought to be dying, and who had been suffering from profuse suppuration. On being seen the pulse and respiration had apparently ceased. Mr. Fitzgerald at once injected thirty drops of a solution of equal parts of liquor ammoniæ fortior and water; the patient was violently convulsed but soon sat up in bed and talked rationally. The good effect lasted some eight hours, when he again showed symptoms of collapse, and a similar dose was injected by another surgeon, a large portion of which must have found its way into the subcutaneous connective tissue instead of into the vein, and no effect was produced. Mr. Fitzgerald then again injected successfully. The convulsive movements were more violent than before, but the ultimate effect was most satisfactory, and no return of the alarming symptoms appeared. He made a good recovery, except that a large slough occurred at the part where the fluid had been injected under the skin. In injecting the vein should be fairly exposed and raised on a probe. This treatment Mr. Shaw remarks, seems to produce a most direct and powerful stimulation of the heart, and might be worth a trial in cases of impending death from chloroform. (*British Medical Journal*, April 7, 1877.)

**Action of Calomel on the Secretion of Bile.**—Messrs. Rutherford and Vignal state that their experiments with calomel prove the following points: 1. Calomel, in doses of ten grains, five grains, or two grains several times repeated, when placed *without bile* in the duodenum of a fasting dog, produces a purgative effect, varying with the dose, but so far from increasing the secretion of bile, only diminishes it, just as happens when any other substance that is not a hepatic stimulant, *e.g.*, magnesium sulphate, is administered. 2. When calomel is *mixed with bile* and then introduced into the duodenum there is no difference in the result, even when the calomel is given in one grain doses several times repeated, and the chances of acting on the liver previous to supervention of the depressing effect of purgation thus allowed. 3. If five grains of calomel be subjected at 100° Fahr. for seventeen hours to the action of dilute hydrochloric acid of the same strength as that of the human gastric juice, not more than one-thirty-fifth of a grain of mercuric chloride is produced. They do not think this quantity is under ordinary circumstances produced; and Scott has shown that pil. hydrargyri does not augment, but in purgative doses actually diminishes the quantity of bile produced. (*British Medical Journal*, July 7, 1877.)

**Pathology of Uræmic Convulsions.**—Dr. F. A. Mahomed, after referring to the received view that uræmic convulsions are due to some of the effete materials which are retained in excess in the blood, owing to the failure of the kidneys to excrete them, and to Dr. Hughlings Jackson's theory, that they are due to anæmia of the brain caused by spasm of the cerebral arteries, a theory that has been supported by Dr. Johnson, points out that a condition of high arterial tension is constantly found in acute and chronic Bright's disease, and that, as a result of this and of the changes taking place in the heart and arteries, generally, various hæmorrhages take place from rupture of minute or large blood-vessels into the mucous membranes of the nose, intestinal tract, uterus, and perhaps air-passages and bladder; in the peritoneum, pleura, and pericardium, and lastly in the retina preceding or accompanying "albuminuric retinitis." Such hæmorrhages are, he remarks, very commonly seen in the brain, sometimes extensive in amount, and he endeavours to show that small capillary hæmorrhages very frequently occur in the brain as the result of Bright's disease, and constitute the causes of the epileptiform seizures generally known as uræmic. He thinks they have been overlooked because it is manifestly impossible to examine all the convolutions of the brain. The better knowledge of the functions of the brain now obtained, however, renders it unnecessary that the search should be so extensive. Given an observation during life of the group of muscles especially affected by the convulsions, the search need only be confined to one or two convolutions, should such minute hæmorrhages appear likely to be their exciting cause. Dr. Mahomed records several cases in support of his theory. (*British Medical Journal*, July 7, 1877.)

**The Chinese Knowledge of Cod-liver Oil and Iodine.**—Dr. Dudgeon, of Pekin, says that in the Chinese Materia Medica no fewer than thirty-one different kinds of fish with scales, and thirty-seven without scales are mentioned. Among so many it would be strange if certain therapeutic virtues belonging to some had not been discovered. The cod is not known in Chinese waters, so far as he is aware, and no oil is extracted from the livers of fishes. The Chinese, however, have found out that the use of fish and fish oil—particularly shad—is of service, and especially in consumptive cases. Phthisis is believed to be infectious. They account for it on the hypothesis that at the moment of death a worm is expelled, which enters the bodies of those in attendance, through the breath. To stamp it out, therefore, the patient, while yet alive, is sometimes put into a coffin and buried, or thrown into a river. This notion among the people is another way, most probably, of asserting the hereditary nature of any malady. The distinguished author (Lishecheu) of the Prentsao or Chinese Herbal, who wrote over two centuries ago, mentions a case of this sort, as reported in another work, where several persons were so affected. The young lady in this instance was found floating in her coffin, in one of the great rivers by a fisherman, and being taken on board and fed on shad, she recovered, and afterwards became his wife. Here we have the germ of our present cod-liver oil treatment. This fish is said to possess insecticidal and anthelmintic properties, and this is the Chinese *rationale* of its use in phthisis. For a similar reason it is also prescribed in fistula, in ano, hæmorrhoids, etc. Oil of this fish is said to be a most certain cure in pityriasis versicolor, the cure being effected instantaneously with one application. This same Herbal mentions various species of seaweed as possessing strong and well-known therapeutic properties, and of special value in the dispersion of hard tumours—goître, for example. They have long been acquainted with the general virtues of the various species of laminaria, and these varieties are mentioned as occurring along the coasts of the Eastern sea, the coast of Corea, and the Malayan Archipelago. The great Herbal speaks of seven chief species. The people in the maritime provinces of China eat seaweed plentifully, both medicinally and as a vegetable food, besides using it as a manure, in this custom resembling the inhabitants of our own Hebrides. It is prescribed alone, chiefly in the form of tincture, its saltish taste having been first washed away, or it is mixed up with other medicines in various prescriptions. Chinese books speak in the most positive manner of the discutient properties of seaweed. Of one sort it is said that tumours as hard as stones can be softened and removed by it. The uses to which the various kinds of seaweed are put correspond with our own uses before the discovery of iodine. It is presented also as a diuretic, and its efficacy in demonology is highly extolled. (The Chinese, in medicine, as in everything else, unite sober fact with childish fable, science with sorcery.) It is especially recommended in enlarged testicle, and in all sorts of hard, cold, chronic tumours that never suppurate. It is said to cause penile erection. In glandular swellings it is ordered to be sucked or chewed. From the Chinese practice the following questions suggest themselves:—Considering the high price of icdine and its preparations and the disagreeableness and occasional indigestibility of cod-liver oil, which has been supposed to owe a part, at least of its virtue, to the presence of preparations of iodine and cognate principles, would it be advisable and advantageous to introduce a tincture and a powder of laminaria into our public dispensaries, poor-houses, etc? Is the Chinese contra-indication of fatty things well founded? After a course of iodine or its preparations are other diseases more easily induced? (*Medical Times and Gazette*, No. 1,390.)

# Extracts from British and Foreign Journals.

**Physiological Action of Quinine.**—According to N. Jerusalimsky quinine given in small and medium doses (1 to 5 grains) always causes in dogs (rabbits and frogs are less suited for these experiments) an increase in the frequency of the pulse; it may be even doubled and more. Variations occur, but it never falls under the normal. The pulse sinks rapidly just before death. The blood-pressure, on the contrary, has in general a tendency to fall, only after each injection there is a short period, when, with variations, it rises somewhat; then it gradually falls under the normal, though not far under, as long as no large doses are given. Large doses (20 to 25 grains) cause the pressure to sink rapidly and at once. The pulse frequency generally falls after a short acceleration. The acceleration of the pulse, as is shown by special experiments (section of the vagi, of the spinal cord at different heights) is the result of a depression or paralysis of the regulating and excitation of the excito-motor nervous system. The condition of the blood-pressure—with medium doses a short rise lasting between twenty and sixty minutes, then sinking, notwithstanding increased pulse-frequency—is explained by the author through a complicated nerve-action. The rise is caused by paralysis of the regulating and stimulation of the vaso-motor apparatus. That the vaso-motor centre in the medulla participates is rendered probable by the fact that after its destruction the rise is only feebly expressed. The effect of quinine on the vessels was ascertained by direct observations on the frog, and especially by the experiments on the spleen to be presently cited. After the excitation of the vaso-motor centre paralysis follows very rapidly, which affects the peripheral vessels, the excito-motor cardiac ganglia, and the cardiac muscles. After large doses the heart itself does not reply to direct stimulation. The conditions here mentioned are those which follow medium doses; after small doses the tonic action, after large the paralytic is more pronounced. In man, the author, after a moderate dose (10 grains) observed acceleration of the pulse and increased heart beat, which in one case increased to palpitation. The cause of the difference in the results between himself and other writers, the author seeks to ascribe to difference in the animal employed. The respiration is always increased by small doses, slowed by large doses, and also rendered irregular, with rapid following asphyxia. This action arises from the effect on the respiratory centre. The hyperæmia, and even the hæmoptysis observed by some authors after large doses of quinine are probably due to paralysis of the vaso-motor centre by the quinine. The action on the temperature was not constant throughout. In most experiments it sank (at most 1·5° Cent., 2·7° Fahr.); in other cases it rose, and this after large doses; and in other cases it varied little from the normal. The author explains these results by the action of quinine on supposed nerve centres. After section of the spinal cord, (1) between the sixth cervical and first dorsal vertebra there was pronounced increase of temperature (3° to 4° Cent., 5·4° to 7·2° Fahr.); (2) in the region of the second dorsal vertebra the reverse; and (3) below the second to the sixth dorsal vertebra, only slight modifications from the normal. The author assumes the existence of a heat-exciting centre, opposite the second dorsal vertebra, and a heat-regulating centre between the sixth cervical and first dorsal vertebra, which influence the exchange of material through trophic nerves. The author explains the modification in temperature by the relation of quinine to these two centres. The increase after large doses would therefore be produced by paralysis of the regulating centre. The rapidity of the blood-current (investigated by Ludwig and Dogiel's Stromuhr) is much slowed by quinine, in the proportion of 1–2 and more. This phenomenon is specially to be ascribed to the paralysis of the vaso-motor centre, for after its destruction quinine can only produce a very slight retardation. With regard to the effect of quinine on the colourless blood-corpuscles, the author confirms the statement of Binz and his scholars. He observed cessation of the amœboid movements, emigration and diminution in the number of these bodies. He further found that the corpuscles which had emigrated had for the most part a single nucleus, whilst previously the greater number were multi-nucleated. Like Manassein, he observed that the red corpuscles became larger under the influence of quinine. Confirming Mosler, he observed also the diminution in the size of the spleen, the organ becoming at the same time tougher, granulated on the surface, and of a brighter colour. After section of the splenic nerves (splenic plexus, or semilunar ganglion, or splanchnic), or of the spinal cord, which produced of course a considerable swelling of the spleen due to paralysis of the vaso-motor nerves, the effect of quinine still occurred, though to a much less extent. It therefore depends primarily on the effect of the alkaloid on the peripheral nervous, and muscular elements of the spleen, and secondarily on the splanchnic and central nervous system. (*Journal of Anatomy and Physiology*, April, 1877.)

**Treatment of Neurosis of the Stomach.**—In the treatment of dysorexia, says Dr. H. Lebert, in a Memoir on the Neurosis of the Stomach, the regulation of the diet is the essential point to be attended to. Whilst variety should be permitted, all indigestible and innutritious substances should be interdicted. In *bulimia* a little food may be given between the ordinary meals, as two or three biscuits soaked in sherry, and a cup of milk may be placed beside the bed at night, but no cooking should be allowed. Moral treatment, gentle but firm, is indispensable. In this condition M. Lebert has found opium or codeine in small doses, as one-sixth of a grain three or four times a day, most serviceable. Bromide of potassium is also useful in doses of five grains or more, or a drachm of the syrup; the same treatment is adapted for heterophagy. Where these means fail and the patient continues to eat improper substances, small quantities of tartar emetic should be surreptitiously added to them, that a cure may be effected by the vomiting induced. *Geophagy* has become a more rare affection since the emancipation of slaves and the better food they have obtained, and it will, he thinks, disappear altogether. For its treatment repose, pure air, and a carefully augmented milk diet, are all that is needed. A little rum or good wine may be added if the patient be much exhausted; more solid food may alternately be had recourse to, and tonics may then be given, beginning with infusions of centaury, orange peel, calumba, and quassia, and passing on to quinine and chalybeates. In *gastralgia* not only the diet but the whole hygiene of the patient must be attended to; milk and farinaceous food, eggs, stewed meats, fish, young and tender vegetable food may be given, but the use of tea, coffee, wine, and brandy, unless in very small quantity should be stopped. Cacao deprived of its fat can in general be taken, as may also small amounts of aërated waters: indigestible substances like legumes, fat meats, ham and pork, are as a rule very inappropriate. The exercise should be regular and moderate, and the advantage of moderation in amusements strongly impressed on the patient. Great benefit is sometimes derived from hydropathic treatment carried out with judgment. In regard to remedies, whilst none should be prescribed that are not absolutely necessary, it is expedient to have several resources against this frequently rebellious disease. We may commence with bismuth, small doses of nitrate of silver and bromide of potassium, and proceed to the preparations of zinc, to nux vomica, and arsenic. Bromide of potassium, which is not good in chronic catarrh of the stomach, is often very useful in pure gastralgia. The sulphate, or better still the lactate of iron, may be prescribed in doses of half to one grain several times a day. When the patient is troubled with eructations they may be temporarily prevented by the administration of from fifteen to thirty grains of the bicarbonate of soda, but it soon loses its effect. M. Lebert has not seen much advantage accrue from the use of valerian, castor, or the fœtid gum resins, though occasionally a combination of tincture of valerian with benzoated tincture of opium has proved effective. In regard to local means the hydropathic compress, either cold or allowed to remain as a poultice, is most useful. Local faradization sometimes removes the pain, and in rebellious cases a large flying blister may be applied to the epigastrium, with or without the subsequent administration of morphia in powder. Vomiting in gastralgia is usually slight and transient, but it should be treated with ice internally and effervescent drinks; opiate injections and poultices, over which a little tincture of opium has been sprinkled may also be used. If the attack have been brought on by some imprudence in diet, the patient should be directed to drink abundantly of chamomile tea, and a small dose of apomorphine be injected under the skin to promote vomiting. (*Archives Gén. de Med.* June, 1877.)

**Iodoform with Iron as an Alterative.**—Dr. A. L. Reichard speaks in high terms of the value of this combination in cases of chronic ulceration of the uterus, and states that he has found it equally useful in hypertrophy of the cervix with some neuralgic pains. The length of time during which the remedy was used appears to have been in some cases very short. (*St. Louis Clin. Record,* vol. iii. No. 4.)

**Acetate of Lead in the Treatment of Granular Conjunctivitis.**—Dr. Pierd'houy, after reviewing the various systems of treatment that have been adopted for this affection, states that he has found the plan proposed by Buys the most successful. This consists in the direct application of the neutral acetate of lead in powder which not only affects the removal of the granulations, but enables the cornea to recover its transparency. He thinks the reason that the salt has failed in other hands is because sufficient patience has not been exercised. It is especially adapted for those cases in which the patient cannot attend daily at the hospital, and it has the advantage of being less painful than the solid nitrate of silver, of suppressing more perfectly the secretion of pus, and thus preventing the spread of the disease, of curing the disease in a much shorter space of time, and of leaving no cicatrices behind. (*Annali Universali di Medicina*, December, 1876.)

**The Enballometer.**—Dr. Fletcher Ingals of Chicago has invented an instrument intended to act as a substitute for auscultatory percussion. It consists of a chest-piece of cylindrical form three inches in length, and $\frac{7}{16}$ths of an inch in diameter, containing a metal plunger or hammer about one inch in length. Soft rubber cushions are placed within the rubber to prevent the clacking sound that would otherwise be produced by the stroke of the hammer. One end of the cylinder is placed on the chest, whilst to the other end is attached a piece of india-rubber tubing terminating in a bulb. On compressing the bulb the hammer is made to strike a blow, the resonance of which is appreciated by a stethoscope. (*Chicago Medical Journal and Examiner,* April, 1877.)

**Iodine and its Preparations in the Therapeutics of Infancy.**—In a clinical lecture delivered at the Paris Hospital for Children, M. Jules Simon lays particular stress upon the following points:—Tincture of iodine should not be applied pure in tubercular children; it should be diluted either with glycerine or with some unguent. Neither iodide of potassium nor iodide of iron should be given to children under two years of age, except perhaps in cases of acute hereditary syphilis, where small doses may be administered. It may be given to the nurse if the child have not been weaned. Older children bear the drug well. Those who are especially benefited by it are patients robust in appearance, but with soft inelastic flesh, and with manifestations of incipient scrofula. Iodoform is of great service in cases of ozœna and scrofulous wounds. Albuminuria has been observed by M. Simon in a large number of cases to follow paintings of the surface with tincture of iodine, especially when it is applied to eruptions. Iodide of potassium produced the same result, but in a smaller degree. (*Moniteur Thérapeutique,* August 7; *Boston Med. and Surg. Journal,* February 8, 1877.)

**The Treatment of Epilepsy.**—According to Kunze we possess in curara a remedy by which cases of epilepsy of very long standing can be cured. He uses a solution of seven grains of curara in one drachm fifteen minims of water, to which two drops of hydrochloric acid have been added. At intervals of about a week he injects eight drops of this solution subcutaneously, and he has found that in some cases where convulsions had occurred for some years, a complete cure was effected after about eight to ten injections. (*Deutsch. Zeitsch. f. prackt. Med.* 1877, No. 9.)

**Aconitia in Tic Douloureux.**—At a meeting of the Société de Thérapeutique (*Gaz. Hebd.* Feb. 9), Professor Gubler drew attention to a symptom, which is little known, consequent on the use of aconitia. A patient, a very intelligent man, who on account of an obscure nervous affection, accompanied by amblyopia, had been taking aconitia in half-milligramme doses, found two hours after beginning a new mixture, which was probably more active than the preceding one, that he was the subject of a strange, uneasy, præcordial sensation accompanied by irregular palpitations of the heart—hearing, as he said, a triple sound in it. Professor Gubler was at first inclined to believe that there was a reduplication of the second sound, but he had not seen the patient while these cardiac disturbances continued. In a young girl suffering from disease of the heart, whom he has subsequently seen, the aconitia had to be left off in consequence of the cardiac disturbances which it caused. These cases reminded him of the observations made by Hottot and Liégeois, who found irregular action and then paresis of the heart were induced by aconitia; and they were of opinion that it induced paralysis of certain portions of the bulb. The conclusion to be drawn from all this is, that aconitia should not be given to persons suffering from affections of the heart. Still Professor Gubler thinks that too much distrust is often exhibited with regard to aconitia, which is in nowise dangerous when used prudently. The aconitia of Hottot and Liégeois is excellent, and that of Duquesnel possesses great power, so that a quarter of a milligramme may suffice as a dose. It is a bad plan to administer it in pills or granules, for it may happen that, encouraged for a certain time by the nullity of their effects, we may thus be led to give a mischievous dose. This nullity may result from an absence of absorption; but with a solution this does not occur. We may give half a milligramme of the nitrate of aconitia for a dose, which represents about a quarter of a milligramme of aconitia. With Hottot's aconitia Professor Gubler has only on one occasion met with an accident, the patient having taken one milligramme and a half in sixteen hours; and in that case there was loss of consciousness. He is therefore not afraid of employing this heroic remedy, especially when he is able to say that *he has never known a neuralgia of the fifth pair, even tic douloureux, resist aconitia.* Some years since he saw a patient who had long been the victim of obstinate trifacial neuralgia, for the relief of which Nélaton has excised all the nerves affected. This only gave temporary relief, and he was about to remove the Gasserian ganglion, as the man declared he would commit suicide, when by the advice of Debout, Hottot's aconitia was tried, and after five milligrammes had been taken the patient suffered no more. In another patient who had suffered agonies night and day for three months, six milligrammes completely dissipated the pains. The remedy was then omitted, and the neuralgia reappeared again to yield with the resumption of the aconitia. We must not, however, expect such success in other forms of neuralgia as we meet with in the trifacial. The aconitia seems to act on the nervous tissue itself, but it is especially beneficial in the congestive forms. Of course the organic lesions, which are often the cause of obstinate neuralgia, pursue their course; but although tic douloureux may be due to a lesion of a progressive nature, Professor Gubler is of opinion that, if we can succeed in relieving for a long time the functional disturbances, a cure may be effected. In a general way, it may be stated that many diseases which at last present organic changes are at first of trifling importance; the neurosis in them engenders the lesion. Locomotor ataxy, for example, is at first a neurosis; and it is only at a later period that atrophy of the nervous tissue takes place. Nutrition is at first effected, the tissues being only secondary. It is on the section of a motor nerve that muscular atrophy supervenes, cellular tissue filling up the vacuities. M. Moutard-Martin agreed in the opinion that the progress of lesions may be arrested by acting on the pain; and in this way he has definitively cured cases of tic douloureux by repeated injections of morphia. (*Gazette Hebdomadaire*, Feb. 9, 1877; abstract in *Med. Times and Gazette*, No. 1,390.)

**Physiology of the Secretion of Milk.**—The influence of the nervous and circulating systems on the secretion of milk has been studied by Röhrig. It is generally admitted that the specific elements of milk are formed from the epithelium of the mammary glands. The dissolved and transformed protoplasma of the epithelium, mixed with the transudation of the blood, is milk. But there is very little known of the physical agents which cause and influence the secretory activity of the gland. Most observers have attributed the principal influence upon the secretion to the nervous system, though no special nerves were known which might act upon the glands. No researches had been made pertaining to the question whether changes of pressure in the circulatory system have any influence upon the secretion of milk. The author, who became interested in this matter, arrived at the following results, from a number of carefully made experiments:—The existence of specific secretory nerves is very improbable. There can only be recognized in the breast: (1) Sensory reflectory nerves. (2) Motor nerves, of which some cause the erection of the nipple, while others act upon the contractile elements of the milk ducts. (3) Vasomotor nerves, which influence the calibre of the vessels. The latter are in relation with the secretion of milk. As soon as they are cut the arteries become dilated, on account of which more blood is carried to the capillary vessels of the breast, and, consequently, filters into the alveoles, which then take up the more solid parts that constitute the milk. Röhrig found further, that the degree of pressure determine sthe secretion to a certain degree. Now, strychninized blood acts as a powerful stimulant upon the vasomotor centres, in consequence of which the smaller peripheric arteries contract, and the blood pressure increases largely. By these facts he was induced to study the action of injected strychnine upon the secretion of milk, and observed, about thirty five minutes after the injection, there was secreted sixteen times more milk than usual. But after a while the function of the gland decreased rapidly. The secretion of milk becomes likewise more active by digitaline and caffeïn, but the strongest action upon the glands is that of Jaborandi. Reverse to the action of these remedies is that of chloral, which was expected beforehand, on account of the fact that it diminishes the pressure in the blood vessels. These results may give some indications for gynæcological practice, especially in cases of galactorrhœa and agalactia. (*Abstract in the Detroit Review of Med.* vol. xi. No. xii. *of a Paper in Virchow's Archiv.*)

**Treatment of Insomnia.**—In a memoir on this subject by M. Willemin, the following conclusions are arrived at:—1. Sleep is caused by diminution of the activity of the nerve cells used in functional work; these physical conditions modify the vaso-motor innervation; then the afflux of blood diminishing the activity of the brain is suspended, and the reparation of the nervous elements takes place. 2. The usual cause of insomnia is the persistence of the activity of the elements of the central nervous system under the influence of some internal or external excitation; it may also depend on active congestion of the brain maintaining the functional activity of the cellules. 3. Insomnia may also result from a state of nervous erethism coinciding with general anæmia, and proceeding from some modification of the modality of the nervous elements. 4. In the treatment of insomnia, it is necessary before all things that the cause should be ascertained. Slight insomnia will be almost always stopped by attention to general hygiene. 5. As it is not possible to remove rapidly the causes of symptomatic insomnia in the majority of acute or chronic diseases, recourse must be had to hypnotic medicines, at the head of which opium and its alkaloids may be placed. 6. Morphia is the most powerful hypnotic principle of opium; but narceine and codeine, though less powerful, do not leave behind them the feeling of general malaise which follows the use of morphia. These preparations are particularly useful in the insomnia that results from pain; they are contra-indicated when cerebral congestion is present. 7. Bromide of potassium, the hypnotic property of which is much less powerful, is indicated in insomnia with excitation of the circulation, as in nervous insomnia, where opiates are often ineffective. It is successfully employed in infants. It is contra-indicated when there is well-marked anæmia. 8. Sulphate of quinine, like the bromide of potassium, appears to exert an influence on the various elements which has for its result the decongestion of the encephalon; and like both of these medicines chloroform in solution succeeds, especially in nervous insomnia. 9. The hydrate of chloral is a pure hypnotic distinguished by the rapidity of its action. It is suitable for almost all cases of insomnia, except certain cases of dyspnœa and cardiac disease, and when there is great debility. 10. The insomnia of the old, and that of debilitated and anæmic persons, may sometimes be successfully treated by tonics as by wine, ether, bitters, and hydrotherapy. (*Archives Générales de Méd.*, June, 1877.)

**Action of Jaborandi.**—Dr. Wagner of Buda Pest has continued his researches on the action of Jaborandi, and the results are reported by Dr. S. Purjesz. The patients treated with it included two who suffered from contracted kidney, one with insufficiency of the bi-cuspid valve, and relative insufficiency of the tri-cuspid valve, with a slight degree of ascites, and one with psoriasis. The author satisfied himself of the accuracy of his former statement, that the more frequently Jaborandi is prescribed in the same person the more rapid is its action; cases occurred, however, in which the perspiration was not augmented, and the salivary secretion was more slowly excited and not maintained with so much irregularity as at first. The frequency of the pulse was usually increased. The temperature rose fifteen times in twenty experiments, remained high for some time and then fell. In regard to the question which has excited so much discussion—whether Jaborandi exerts a diuretic action, a distinctly affirmative answer is returned. On the other hand, the increased discharge of urine was accompanied by an increased elimination of albumen. He does not think it a very advisable remedy to give in cases of cardiac disease, as the dropsy was not materially relieved by it; nor is it more appropriately given in cases of chronic parenchymatous nephritis. He thinks it will only come into use when certain disadvantageously acting elements in the drug have been recognized and separated. (*Deutsches Archiv f. klin. Med.*, Band xvii. Heft vi.)

**Bone Marrow in Pernicious Anæmia.**—In a letter to Virchow, Cohnheim (*Virchow's Archiv*, 1876, lxviii. 291) speaks of a change observed by him in the bone-marrow in a case of pernicious anæmia. He desires to call the attention of other observers to the alteration, as he has been unable to find any mention of a similar condition, and it seems desirable to ascertain whether the appearance is an accidental or a constant feature in this affection.

The patient was a male adult, under Biermer's care, and presented the typical features of this disease. The gradual onset without evident cause, the waxy, eventually yellowish skin, the retinal hæmorrhage, the frequent, soft, finally bounding pulse, and the cardiac and vascular murmurs were characteristic. The patient, as usual, complained of short breath, great feebleness, and debility.

At the autopsy the usual appearances were found. Pallor of all the organs, multiple, punctate hæmorrhages in the brain, retina pericardium and endocardium, renal pelves, bladder and mediastina. The heart was in a state of fatty degeneration, there was dense hyperplasia of the spleen, a large fatty liver, and the lungs were œdematous.

The marrow of all the bones, vertebræ, ribs, sternum, and cylindrical bones was very red, but without evident hæmorrhage. The microscope showed an almost entire disappearance of the fat-cells of the marrow. Instead there were found colourless cells of various sizes, single multinucleated giant cells, and a few cells containing red-blood corpuscles. Almost an equal number of red-cells were found. Of these the ordinary bi-concave disks were in the minority, while globular, red non-nucleated corpuscles were more noticeable. These varied in size from the diameter of a normal blood corpuscle to thrice that of a white corpuscle. Still more abundant were red nucleated cells, varying in size, though most of them were equal in this respect to the smaller epethelioid marrow-cells. The nuclei were coloured like the cells.

The blood had been repeatedly examined till within a few weeks of death, but no nucleated red-blood corpuscles had been found. They were present, though not in large quantities, in the blood removed after death from the body veins. The spleen and liver contained them also. Apart from the anæmias resulting from single or repeated losses of blood, and from those due to feeble nutrition, including the consumption of nutriment in excessive secretion, or in the production of large tumours, there is a special anæmia developing irrespective of the previous conditions, and dependent upon a primary disease of the blood-making organs. Characteristic of the progressive pernicious anæmia is the preferable or exclusive affection of the red blood corpuscles. It may be considered as representing a primary disease of those parts of the blood-forming organs, which are concerned physiologically with the production of the red blood corpuscles. (*The Boston Med. and Surg. Journal*, April 12, 1877.)

# Notes and Queries.

CHLORAL IN HOOPING COUGH.—Dr. Milligan, Wirksworth, writes:—Early in the present year I saw five cases of hooping cough in one house, of ages varying from ten years to eighteen months. All were uncomplicated; in the eldest the spasms were very violent, and in three cases the attacks very frequently terminated in vomiting. In all, the characteristic cough was well marked, and there was discharge of a considerable quantity of glairy tenacious mucus. Belladonna and bromide of potassium having proved of little service, I gave chloral hydrate in doses of from five grains to one grain, according to the ages of the children, three times a day, with remarkable effect. After four or five doses the spasms became less violent, and the sickness in the three affected with it ceased, and at the time of the next visit in five days, the specific symptoms had almost disappeared leaving only slight catarrh. Since that time I have only treated seven other cases with chloral, and have found good results in all. The decided effect of this drug on reflex irritability, and its proved utility in many cases of infantile convulsion and chorea, lead to the belief that more extended trials will confirm the high opinion I have formed of it, as a remedy in the treatment of hooping cough.

## ERRATA.

LIEBREICH ON CHLORAL.—We have received some corrections for Professor Liebreich's Paper on Chloral, which were too late for the June number, and were not inserted in the July number on account of press of other matter.

*After the words* "cake chloral," page 404, 19th line from the top, *insert* "by means of distillation."

*Before the word* "decomposition," page 405, 9th line from the top, *insert* "sudden."

Omit the note p. 407.

*After the word* "chloral," page 408, 23rd line from the top, *insert* "generally in a person of normal constitution."

*Instead of* "medicine," page 409, 2nd line from the top, *read* "science."

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

## Department of Public Health.

# A REPLY TO AN ADDRESS OF PROF. MAX VON PETTENKOFER OF MUNICH,

### *Entitled, "Nine Propositions bearing on the Ætiology and Prophylaxis of Cholera, deduced from the Official Reports of the Cholera Epidemic in East India and North America."*

BY ELY MACCLELLAN, M.D.,

*Surgeon, United States Army.*

(*Continued from page* 78.)

THE facts obtained as to the diffusion of cholera in the United States in 1873 were by no means confined to the influence of infected individuals, for it was demonstrated by many instances that fabrics which had been exposed to cholera infection were powerful agents in developing the disease in otherwise healthy localities.

Before proceeding to a consideration of the three instances to the rebuttal of which Dr. von Pettenkofer devotes so much space, I would ask his attention to the following instances, which seem to have escaped his critical eye.

I. A negro girl who was employed as a servant in a family living in the city of Jackson, Mississippi, was taken with cholera and died after an illness of fourteen hours. The family of this girl lived in the country some miles from town. A few hours after her death her father and mother arrived, and removed her bedding and clothing to their home. One week later the entire family, consisting of the parents and five children sickened with cholera, and all except the father died.[1] If the father and mother were infected in Jackson, they and the bedding and clothing, in turn, infected their children in their distant home.

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[1] *Cholera Report*, p. 123.

II. At New Creek, Mississippi, a negro man stole from a house that had been abandoned on account of cholera, some articles of clothing and carried them to his own home. Within three days this man, his wife and three children were taken with cholera; the wife alone recovered.[1]

III. At Nashville, Tennessee, in a portion of the city in which no other cases of cholera occurred, several washerwomen, who had washed the clothing of cholera patients, died of the disease.[2]

IV. At Shelleyville, Tennessee, a cabin in which several deaths had occurred amongst negroes was abandoned, and remained unoccupied until after the epidemic was arrested, when a man sick with rheumatism moved into it. On the second day of his occupancy he sickened and died of cholera.[3]

V. At Chattanooga, Tennessee, a negro woman was employed to take charge of two children whose mother had died of cholera. In place of destroying the infected bed-clothing, as she was ordered to do, she saved a portion and had them washed. The woman who did the washing became infected and died of cholera.[4]

VI. At Bowling Green, Kentucky, a negro woman washed the clothing of a man who died of cholera on board of a steamboat on the trip from Evansville, Indiana. Within thirty-six hours she was dead from cholera, and the disease rapidly spread.[5]

VII. A lady of Louisville, Kentucky, went to Bowling Green on a visit, was taken with cholera and died after twenty-four hours' illness. Her body, *clad in the clothing in which she died,* was placed in a wooden coffin, was taken to Louisville and into the house of her mother; where the coffin was opened and the remains were viewed by the family. The arrival of this dead body was followed by five cases of cholera in that family, three of which proved fatal. This was in a portion of the city which was otherwise entirely uninfected by the disease.[6]

VIII. At Lancaster, Kentucky, after the subsidence of the epidemic, the inceptions of which have been noticed on a previous page, ten days after the last case had occurred in the town, an elderly lady who resided some miles in the country visited Lancaster and stopped at the house at which the first case of the epidemic (the man from Tennessee) had been sick with cholera, and in which he had died. She was given the room which had been occupied by the cholera case. She slept one night upon the bed in which the man had died, and the next day she was taken with cholera, and died after thirty-six hours' illness.[1]

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[1] *Cholera Report,* p. 124.
[2] *Ibid.* p. 153.
[3] *Ibid.* p. 165.
[4] *Ibid.* p. 212.
[5] *Ibid.* p. 265.
[6] *Ibid.* p. 267.

IX. After the arrival of the man from Tennessee at the town of Lancaster, and after the development of cholera in his person, his father-in-law, who resided ten miles north-east of the town, came to Lancaster to visit him. This old gentleman remained one day and one night with the sick man, and on the second morning, being sick himself, he started for his home, was taken with cholera on the road, and was dead in eight hours after leaving the town.[2]

X. Upon the summit of a high hill east of the town of Lancaster was a camp of United States infantry, in a most admirable sanitary condition, and supplied with drinking water from a spring so located as to be beyond even a suspicion of contamination from any of the town drains. The commanding officer of the post being unmarried, employed the wife of a soldier to be his housekeeper, and this woman with her husband occupied rooms in the rear of that officer's quarters. Thirteen days after the arrival of the Tennessee man, nine days after the first cholera death in the town, and after nineteen fatal cases had occurred, this man and woman both died of cholera. It was then found that in spite of orders they had been having their clothing washed by a negro woman who lived in the most infected portion of the town. Five days later a soldier who had nursed and prepared for burial the remains of this man and woman died of cholera; two non-fatal cases subsequently occurred in the camp.[3]

XI. The first case of cholera in Birmingham, Alabama, was in the person of a man who had been perfectly healthy until after the arrival of his bed and bed clothing, which had been sent to him from Stuntsville, Ala., and from that portion of the town which was infected with cholera. Before the occurrence of this case, Birmingham was entirely free from the disease, but after it the disease spread rapidly.[1]

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[1] *Cholera Report*, p. 305. [2] *Ibid.* p. 302. [3] *Ibid.* pp. 302-304.

These eleven instances, selected from the pages of my report, are at least corroborative evidence of the theory that fabrics which are infected with cholera are liable to cause explosions of the disease at great distances from the original seat of infection.

Instance IX. is also cited as one strongly illustrative of the fixation of the cholera poison upon inanimate objects, which have the ability under certain conditions of diffusing the disease. It has been shown that the first and last cases in the Lancaster epidemic terminated in the same house, in the same room, and on the some bed, although a period of thirty days intervened between the cases, while no other resident of that house was infected. It could not therefore be accounted for on the "local" theory, nor by underground water.

The inhabitants of this little country town have been taught by sad experience (as were the tribes of Indians who have been already mentioned) that cholera is a disease which they could suffer from only when it was brought to them by individual agency. They had received their first hard lesson from the epidemic of 1833;[2] the lapse of forty years had not made them forgetful, and when the presence of cholera was announced they acted promptly; all who could do so took themselves out of harm's way. The sophistry of Pettenkofer, Cunningham, or Bryden would be thrown away upon these people. What they have seen with their eyes they believe in their hearts.

Von Pettenkofer has devoted considerable space to the narrative of three instances in which I have claimed that articles of household property infected by cholera had occasioned distinct outbreaks of the disease in the United States. These instances will be found on pages 365, 440, and 462 of my report.

It was not until the receipt of the valuable report of Mr. Netten Radcliffe, on the Diffusion of Cholera and its Prevalence in Europe during the Ten Years, 1865–74, in the early part of the present year, that any necessity appeared for doubting the accuracy of the representations as to the first two of these instances, but a study of Mr. Radcliffe's facts made it evident that they may have to be more minutely traced. A new investigation therefore has been instituted, which has already thrown some stronger light upon the subject, and from which I shall ultimately be able to completely relieve the mind of Dr. von Pettenkofer of the fear (or hope ?) that some one has been hoaxing me.

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[1] *Cholera Report*, p. 411.

[2] *Ibid.* p. 300.

Were I to take up this address and review of Dr. von Pettenkofer's and consider all his statements seriatim, attempting to correct all his errors and misrepresentations, it would be a task as stupendous as it would be stupid. But there are some assumptions which deserve notice. The researches of Thiersch, Sanderson, and others on the infection of mice with cholera dejecta are swept away by the assertion that Ranke has shown that mice remain healthy so long as cholera stools are given to them, but die when they have been fed on paper. Because Ranke starved white mice to death Thiersch and Sanderson were mistaken. Pettenkofer says (p. 159 of *Practitioner*), " but unfortunately the same effect follows if the strips of paper are given to the animal to eat without being dipped in the cholera evacuation." Thiersch and Sanderson both published the most elaborate details of their experiments, and the results which they obtained, Ranke's *resumé* is :—1. " I have not been able to observe that a specific substance is found in the decomposed fæces of cholera patients which has any effect upon white mice." 2. " Filter paper, consumed by white mice, appears to affect their health injuriously."

It must have been a most sublime faith or audacity upon the part of Dr. von Pettenkofer, that his sweeping assumption would be accepted by the scientific world without investigation.

What is maltreatment of animals in Stögyes' hands becomes carefully conducted experiments in those of Drs. Lewis and Cunningham, who have been endeavouring to induce cholera in dogs by injecting cholera fluids into the veins, and by making sections of the splanchnic and mesenteric nerves.

The only notice that it is necessary to make of the definition which Pettenkofer gives to the word *contagion* is to refuse to accept it. He writes " the term contagion is now applied to any infectious material which, contained in the secretions of the sick, can be transmitted by inoculation to the healthy."

The author of this ridiculous definition is at perfect liberty to content his mind with it; few will accept it, as but few have accepted his hypothetical utterances as to cholera in ships, and his denial of drinking water as a source of diffusion of disease. It is easy indeed to refute his statement upon page 229 of the review, that in the case of the epidemic at Lebanon, Ky.,[1] there was any local influence which was as powerful as the drinking-water in causing the outbreak. From page 305 to page 310 of my report, Dr. von Pettenkofer would have found a detailed account of this outbreak, the factors of which were: cholera-infected individuals, the neglect to disinfect the excreta of such cases, the location of these cases upon a public drain, a violent rain-storm, which washed the surface of the ground around the cholera-infected houses, an open well upon the banks of the drain, from the overflow of which the well was "flushed," the transportation of this water, in a covered water-waggon, to the Mavian County Fair Grounds, at least a mile from the well, the drinking of this water by some of the visitors at the Fair. *Result* :—Cholera in the persons of many who drank of the water, but none in those who did not drink of the water, but who did inspire the air of the locality.

On page 232 of the *Practitioner*, Dr. von Pettenkofer desires to know why it was that the epidemic of 1873 in the United States, "proceeding from the south and from New Orleans, where it only very feebly developed itself, notwithstanding the absence of all hygienic measures, and in spite of the general unbelief in the contagiousness of cholera, ascended through the valley of the Mississippi and its contributaries with so capricious a selection of places it attacked, in order to concentrate in so serious a manner in Kentucky and Illinois; and why it never reached the State of New York, although so many railways and other means of intercourse from the infected regions here meet, and why in Chicago, in spite of all the impurities described from page 213 to 219, and in spite of poverty, the epidemic was limited to such narrow confines?"

This query proves Dr. von Pettenkofer to be a worse geographer than he is an epidemologist.

The premises of these queries are incorrect. It is untrue that at New Orleans there was an absence of all hygienic measures, for it had at the time a most efficient board of health. The sanitary condition of the city early in 1873 was comparatively excellent, although the unusually energetic system of house to house inspection had been suspended until the month of March. The official reports of the Louisiana State Board of Health are a sufficient refutation to that absurd statement.

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[1] *Cholera Report*, p. 59.

It is equally untrue that the epidemic exhibited any conspicuousness as to the selection of the places attacked. If Dr. von Pettenkofer had not overlooked the outline map which faces page 91 of my report, he would have found thereon information which would have prevented the question; and had he read the narrative at all, or with the least care, he would have seen that the disease was diffused solely along *the lines of travel,* and that whenever suitable conditions were reached by the specific poison, an explosion occurred.

Why did the disease never reach the State of New York? Simply because no infected individual suffered from an explosion of cholera within the limits of that State. It would have been a far more pertinent question to have asked, why the disease never reached the States of South Carolina, North Carolina, Virginia, or other Atlantic seaboard States, or why it did not occur in the State of Kansas, where in former years it flourished with such deadly vigour? and the answer would have been precisely the same, Because the disease was not carried there.

Does Dr. von Pettenkofer suppose that the entire city of Chicago was impure, and that it is inhabited by a pauper population? We would inform him that it is almost a city of palaces, and that the epidemic of that city is a beautiful illustration of the theory that cholera arises and thrives only where it is carried by individuals.

Dr. von Pettenkofer must also be informed that New Orleans is a very large port of entry, and that from that city the major portion of the foreign supplies of the Mississippi valley are drawn. He must also learn that New York is distant from New Orleans by the nearest land route 1,375 miles, from Memphis 1,164 miles, from Washville 1,005 miles, from Saint Louis 1,043 miles, from Chicago 899 miles, from Louisville 853 miles, and from Cincinnati 749 miles; and that the New York health authorities had thoroughly aroused the attention of all the towns between Cincinnati and New York. Had he read my report, he would have learned, on page 468, that almost the entire number of emigrants reaching New York leave the city upon the day of their arrival, and that from that very reason they do not open their effects in that city, and that an especial Customs Bureau is located at the point at which by law they are obliged to land.

Upon page 233 of the *Practitioner*, Pettenkofer makes a strong argument in favour of the "practical theory." He would do away with powder magazines and would permit sparks to fly. The absurdity of this is evident. About magazines, which are fixed facts and must remain, all that human ingenuity can devise is done to prevent the spark from originating; but ever and anon a spark does reach the powder, and an explosion follows. So it is with magazines from which cholera explosions occur. It is a task far beyond the power of Dr. von Pettenkofer to rid the surface of the earth of filth, and of decomposing organic matter. It is beyond his power to compel human beings to live in accordance with exact law. In spite of him the magazines will exist for ever, as they have existed for all time past, and yet he would prohibit the destruction of the "spark," nay, he would delude us with the idea that it has no existence. Those whom Von Pettenkofer unfairly calls "contagionists," would abandon none of the hygienic precautions of which those whom he calls "localists" talk and write so learnedly, but which they practically neglect. The first class strive to reduce the number of magazines in every community, but knowing from experience that it is beyond human power to remove them entirely, they seek to extinguish each one of Pettenkofer's 1,000 sparks; and that is accomplished by stamping out the disease whenever and wherever it may occur.

I am almost inclined to think that Dr. von Pettenkofer is not familiar with what is claimed from this "practical theory," and I beg him to follow me for a few moments.

It is claimed that cholera is diffused throughout the world by the excreta of individuals infected with the disease; that it is the molecular matter contained in such excreta which constitutes, when in decomposition, the infectious material; that before decomposition takes place and after it is completed, such excreta are innoxious: that when the excreta of cholera cases come into contact with decomposing organic matter they have the power, by a rapid proliferation, of infecting the entire mass; that the excreta of cholera cases coming in contact with and drying upon any fabrics will retain their power, and that whenever influenced by heat and moisture, the process of decomposition at once takes place as it would in other particles of organic matter; that the cholera poison may be received in food, drink, and from the atmosphere of infected localities; that the cholera is infectious only when the specific poison of the disease gains access to the alimentary canal; that in no other way can the disease be communicated to a healthy subject (to be obtained from the atmosphere the poison inhaled must become mixed with the saliva and swallowed); and lastly, it is claimed that the development of the disease in an individual is influenced to a marked degree by the condition in which his digestive powers may be when the dose is received.

Does the theory of Dr. von Pettenkofer, added to the nine propositions of Cunningham, offer as logical a conclusion from our stock of cholera knowledge?

Dr. von Pettenkofer has been considerate enough to suggest quite an array of cholera literature for my study. I regret that I have neither time nor space to indicate how fully and ably he has been collecting facts to strengthen the theory which I advocate. In a future paper I hope to be able to give the results of my study of Pettenkofer's history of the cholera epidemic at the prison at Laufen, as well as some other of his works, to which I am under the greatest obligations.

Finally, I am handed over to the mercy of the Bengal sanitary authorities, to the mercy of men who are now almost helpless before the judgment seat of scientific criticism. It has been time and again demonstrated that these sanitary authorities have for twelve long years done absolutely nothing towards preventing the spread of cholera throughout and from India. It is true that they have written much upon sanitary improvements, and have permitted their sanitaria to become hotbeds for the propagation of disease. They have devoted their energies to the consideration and development of conjectures about locust flights and other aërial absurdities, and have permitted the atrocities which are yearly enacted at Pavi and Juggernaut to pass unnoticed. After an experience of twelve years, the "so-called best practical workers that the world has ever known," which means bureau writers who have never had personal field experience, have produced a series of nine propositions, in opposition to which I am more than contented that mine should stand before the world.

It does seem as if the Bengal sanitarians had failed to comprehend the first conditions of their problem.

Hindostan, having an area of 1,465,331 square miles, has a population of over 240,000,000, which, if the entire superficial space of that territory were inhabited, would give a population of about 163 inhabitants to every square mile; but the population is not thus equally distributed.

The Presidency of Bengal, having an area of 739,504 square miles, has a population of over 100,000,000, which, if equally distributed, would give 134 inhabitants to the square mile.

The Presidency of Madras, having an area of 183,899 square miles, has a population of 31,250,000, which, if equally distributed, would give an average of 170 inhabitants to the square mile.

The Presidency of Bombay, having an area of 192,119 square miles, has a population of 16,228,774, which, if equally distributed, would give 84 inhabitants to the square mile.

In these three great Presidencies, having a united population of 147,478,774 individuals, in the year 1875 no less than 261,230 cholera deaths occurred; which is at the rate of one death to every 564 inhabitants. If we accept the estimate that but 50 per cent. of cases of developed cholera prove fatal, we shall see that in that constricted portion of the earth's surface, in the year 1875, over half-a-million of cases of cholera occurred, and this is exclusive of all cases of choleraic diarrhœa, which class of cases in my opinion exercise even a greater virulence in the diffusion of the disease than do those in which the violence of the attack is more pronounced. Against this disease, what have the Indian sanitary authorities done?

The most careful and laborious study of their reports fails to develop anything of practical value. The task of tracing the disease was much too great for them, therefore they assert that its diffusion is influenced " by certain conditions of air or soil, or both combined, as yet little understood."

If cholera is induced by certain conditions of air and soil, I would again present for the consideration of Dr. von Pettenkofer and the Bengal authorities the statement made upon page 659 of my report. This refers to the districts of the United States in which each epidemic of cholera that has occurred has exhibited its most intense virulence, and to the region to which the epidemic of 1873 was confined.

During the late civil war, the United States had in the field an army of 2,335,942, or during the years of the war a mean strength of about 783,905 men. These troops were in camps constantly exposed to all the vicissitudes of campaigns, or were in hospitals where in spite of the lavish precautions which were adopted frequently, all the disadvantages of over-crowding and deficient food were present. Vast numbers of men were transported to and from the scene of active operations upon steam transports. Prison pens were formed, in which overcrowding, bad ventilation, indifferent police, and unsuitable food were present to co-operate with local malarial influences upon the unfortunate prisoners, and these events occurred within the limits of the worst malarial districts of the United States.

The record of the medical history of the war demonstrates that there occurred, in the army, of malarial diseases, *one million four hundred and sixty-eight thousand four hundred and ten cases, with forty-six thousand three hundred and ten deaths, and of intestinal diseases, one million seven hundred and sixty-five thousand five hundred and one cases, with forty-four thousand eight hundred and sixty-three deaths.* Add to these figures the statistics of the United States Navy and those of the Confederate Army and Navy, and the mass of circumstantial evidence is overwhelming. The figures at our command give a total of *ninety-one thousand one hundred and seventy-three deaths* from malarial and intestinal diseases occurring in a highly malarial district, and yet not one case of cholera occurred upon the continent. As if to emphasise this fact, of the *two million three hundred and thirty-five thousand nine hundred and forty-two men* composing the army of the United States, but *three hundred and five deaths* occurred from cholera-morbus. Reverse this picture. The war was at an end, the armies of the North and of the South had been disbanded but a few short weeks, when cholera *having been imported into the United States,* the movements of recruits for the small standing army of the nation diffused the disease and induced the American epidemic of 1866 and 1867.

It is very true that the theory adopted by the Bengal authorities is the simplest and easiest so far as they are personally concerned; for the adoption of the theory that cholera is diffused by the migrations of individuals would necessitate a vast amount of laborious work inside and outside of the endemic area. The vast majority of cholera observers are convinced that cholera is endemic in the Presidencies of Bengal, Madras, and Bombay, but they are as firmly convinced that in no other portion of the inhabited globe has an epidemic of the disease ever occurred that could not be traced back step by step to its home.

It is pertinent to the subject that I should ask the attention of readers to an extract from an address published by myself in 1876.

"It is at present a notorious fact, that during the past year cholera having escaped from India spread to the eastern shores of the Mediterranean. It is also true that during the past year there have been violent explosions of the disease in India, and that the disease more frequently breaks out in the hill country than it has ever before done. It is a fact that a considerable body of Mohammedan troops in Syria became infected with the disease, which they communicated to the surrounding country. *Again, cholera history is in the process of repeating itself.* Nations are arming for the final contest between the cross and the crescent. The followers of Mohammed are ranging themselves upon the line of the Danube. The Porte will from necessity call in all her outlying bodies of troops, and it may be looked upon as a matter of almost absolute certainty that before the Eastern question is settled cholera will have invaded Europe; and in one or two years North America will in all probability be called upon to record a new epidemic of the disease.

"The time therefore has come when it is necessary that medical men should consider with care all facts which have been elicited from previous epidemics. The subject is so vast, the interests at stake are so vital, that all minor considerations should be set aside, and while the differences of opinion of all fair reasoning minds should be respected, no one should hesitate to form and record his opinion."

And this I do with even less hesitation than when I wrote the original article, as the events of the present are rapidly fulfilling my prophecy. Dr. von Pettenkofer will in all human probability soon have an opportunity of recording another epidemic of cholera, which will of course originate from local causes. I hereby give him timely warning.

There remains but a single point to which I would ask the attention of Dr. von Pettenkofer, and that is the facility with which diseases may yet be traced in the United States. This is necessary, as he has exhibited such a want of geographical knowledge.

There is in the United States at present only a population of 40,000,000 inhabitants, less by 200,000,000 than is the population of Hindostan, The inhabitants of the United States are scattered over an area of 4,000,000 square miles, therefore he may perceive from this simple fact that the Americans have not the same necessity for being "localists" as have the gentlemen of Bengal. Almost every village has its newspaper, and medical journals are published in every state and large town. Telegraphs abound and news flies fast. Physicians are numberless, and the people are proverbially practical and intelligent. Truth cannot be long overlooked, nor can it be suppressed. There is much upon these pages the writing of which has caused me pain. I have always entertained a sentiment of respect for Dr. von Pettenkofer, which has grown from the earnest and ingenious way in which some of his earlier work was accomplished; but his attack upon me has been marked by such violations of the rules of good breeding, such a disregard of the laws of civilised criticism, by such marked misrepresentations, and by such suppressions of the truth, that no other course is open to me.

# THE PRACTITIONER.

SEPTEMBER, 1877.

## Original Communications.

### BROMIDE OF POTASSIUM IN PUERPERAL CONVULSIONS.

BY G. WRIGHT HUTCHISON, M.D., ABERDEEN.

In the two following cases of puerperal convulsions, bleeding was employed—in one case generally (from the arm), in the other locally (cupping back of neck)—with some benefit, but in both the exhibition of bromide of potassium was followed by an early diminution in the severity of the convulsions, by a longer interval between them, and by steady general improvement. In neither case, do I believe, would the improvement have been early, steady, and continuous, as it was, without the use of the drug. Taking into account the dose which was exhibited, and the frequency of its administration, together with the early and steady improvement of the cases, after its exhibition, it is, I think, hardly possible to separate their successful issue from the direct effect of the bromide.

Mrs. H. I., *æt.* twenty-six, a primipara, short, of florid complexion, and of sanguineous temperament, engaged me to attend at her confinement, for the middle of February, 1876. On the afternoon of January 26th, her husband being from home, the neighbours, not having seen her about since morning, forced the door, which they found had been bolted inside, went up stairs, and found her lying in bed insensible, and violently convulsed every two or three minutes. A message was immediately sent to my house, but I being out, my friend and neighbour Mr. Hopgood went to the case. He found the patient in the following state :—insensible, pupils contracted, and insensitive to light, face and neck swollen and livid, the carotids throbbing forcibly, the jugular veins prominent, teeth clenched, lips quivering, bloody foam issuing from corners of mouth (she had bitten her tongue), pulse full and laboured, varying as to rapidity with the onset and subsidence of the convulsive attacks, which came on every two minutes, were most violent, and involved the whole body, the breathing laboured, and accompanied with a hissing sound. On digital examination he found the os uteri dilated to about the size of a shilling-piece, head presentation. Mr. Hopgood bled from the arm to the extent of fifteen ounces, and gave a large soap-and-water injection per rectum. After this a decided improvement took place, the convulsions becoming less violent, and the interval between them being considerably prolonged, but she still remained unconscious. He then left the patient, directing the friends to report to him in an hour, should I not have returned home by that time. Reaching home soon after this, I saw the patient, and, on remaining with her for some time, found that the convulsions gradually got worse, and, moreover, that they were synchronous with the labour pains, the os gradually dilating the while. I was also informed by her husband that she had been complaining of intense pain in the head for the last two or three days. Seeing that matters were assuming a very serious aspect, I sent for Mr. Hopgood and my friend Mr. Jackson, and on consultation we determined to deliver as soon as possible. This was effected, with great difficulty, by version under chloroform. The child was dead, having evidently perished in the process of delivery, and was not, we thought, quite at full time. During the administration of the chloroform, the convulsions were less violent. After delivery, and after ceasing to give chloroform, the convulsions gradually increased in severity till midnight, when for an hour they became most violent, and almost continuous. At this hour (12 to 1 A.M.) they always increased in severity, in so much so that her attendants looked forward to midnight with dread.

*January* 27*th.*—Forenoon. Still convulsed very often, unconscious; passes urine under her; tongue bitten, hanging over chin, very much swollen, and very dry and furred. No swallowing. Ordered tongue to be kept moist with a feather, and injections of raw eggs and new milk per rectum.

*January* 28*th.*—Still convulsed—had been very bad between 12 and 1 A.M.; unconscious. She now sucked the feather when put to her mouth. Pulse, which yesterday was 112, now 96. Ordered a little beef-tea by the mouth, a teaspoonful at frequent intervals, and to continue injections of milk and eggs by bowel. Prescribed twenty grains of bromide of potash with five grains of the bicarbonate in an ounce of water every two hours. By the afternoon the tongue had returned into the mouth.

*January* 29*th.*—Convulsions feebler and less frequent, since the exacerbation at midnight. Still unconscious. Taking plenty of nourishment by the mouth, and the medicine.

*January* 30*th.*—Still convulsed at long intervals; consciousness returning; answers when spoken to sharply and close to her ear. When asked about her head she says it is very painful. Dry-cupped back of neck, which she said relieved her. Ordered to apply mustard to nape of neck, and to continue beef-tea, and medicine.

*January* 31*st.*—Patient had no convulsions after ten o'clock this morning. Now quite conscious, and remained so. Does not remember bolting herself into the house, and going up stairs and lying down on bed on the 26th; in fact she remembers nothing since the morning of the 24th, when she first began to complain of her head. An occasional muscular tremor still creeps over the whole body. Pulse 80. Tongue is very sore, having been deeply wounded by the teeth. After this patient did well.

Mrs. G. H., *æt.* twenty-two, was confined at 3 A.M. April 30th, 1877, of her first-born, a fine healthy baby. I found her a short, thick-set person, of pale, pasty complexion, and subject to habitual constipation; of phlegmatic temperament. Her labour lasted ten hours, and was not by any means a severe one. About an hour after she was confined, I left her comfortable, and, as I thought, doing well. I had not left her a quarter of an hour when her husband came after me, saying his wife was in convulsions. I immediately returned, and found her being held by the nurse and another female, in the midst of a violent convulsion involving the whole body (opisthotonos), and almost completely unconscious. After watching the case three-quarters of an hour, and finding she could swallow, and that another attack did not come on, I left her, prescribing fifteen grains of bromide of potash, combined with ten drops of aromatic spirits of ammonia, every hour. On visiting patient again at 10 A.M., nurse told me she had been convulsed five times altogether, and that she had been able to give her but one dose of the medicine, as she had been unable to swallow. I found her quite insensible, pupils dilated, pulse full and laboured, face not very much swollen, and not livid, and a general muscular tremor every now and again passing all over the body. Finding she could not swallow, and that the convulsions had been increasing in severity, I now cupped on the back of the neck, taking about six ounces of blood. Soon after this she swallowed a little beef-tea, and her medicine, and for an hour and a half remained free from convulsions. I left, having given directions as to administering small quantities of nourishment at frequent intervals, and as to giving her the medicine every hour. At 9 P.M., as she had not passed any water, I drew it; and I found that she had been improving all day, taking plenty of nourishment, and the mixture; that she had been convulsed four times since 10 A.M., each time less severely, although every now and then the slight muscular tremor came over the whole body; that she was still unconscious, and that the pupil was more sensitive to light. Next morning by six o'clock she had returned to consciousness, the previous twenty-six hours being quite a blank to her. The medicine was continued in the same dose every two or three hours for three days more, and she made a good recovery. This patient had in all nine convulsive attacks, five before she was bled, and four after. For two days the urine was albuminous.

# ARE THERE LAWS OF THERAPEUTICS?

BY A. H. RABAGLIATI, M.A., M.D.,

*Surgeon to the Bradford Infirmary.*

HOWEVER sanguine of the future advancement of his art the practitioner of medicine may be, he will scarcely assert that up to the present time the vast and detailed amount of general information which he daily makes use of in treating his patients has been put into scientific form. There are some even who say that it is hopeless to expect that medicine will ever become a science. On a recent public occasion, an authority so eminent as Dr. Matthews Duncan told the students of the Edinburgh Schools of Medicine that it was futile to hope for an era in medicine other than those of Hippocrates and of the fifteenth century. The era of Hippocrates, as I understand it, means simply the careful observation of the symptomatology of disease, with an attempt, by no means unsuccessful in its way, to lay down the principles of prognosis. The era of the fifteenth century, on the other hand, might be shortly characterised as an exact description of the structure of the parts of the human body, with a good deal of speculation as to the real or imaginary uses of these parts. Of therapeutics in the proper sense of the term, there was little or none in either of these eras, for the mass of unverified hypotheses which ushered in the chemical theory following the discoveries of the latter period never succeeded in displacing the time-worn methods of treatment by venesection and clysters, nor yet those metaphysical speculations so dear to the Greek mind that characterise the former. Now if the features of these two periods in the history of our art have been at all fairly described, it is at once manifest that before medicine can assert her claim to be called a science, she must do something more than obtain a thorough knowledge of the phenomena of disease and of the structure and function of the parts affected. Of what use, it may be asked, is an intimate knowledge of the ultimate lobules of the liver, with their surrounding, entering, and emerging vessels and special ducts; or what is the advantage of knowing the relations which the tubules, straight and convoluted, the vein and the artery bear to the Malpighian bodies of the kidney, if this information is not associated with a knowledge of what agents tend to act upon the former, and what leave the latter unaffected? Manifestly if a patient is affected in the lungs it is useless to adminster an agent which acts only on the kidneys, and if his kidneys are affected it is equally absurd to order him that which will simply alter the rate of his heart. The study of symptomatology *alone* is indeed more or less a dangerous one, since a similar train of symptoms may be induced by the agency of many different causes acting on many different parts; and he who judges only from symptoms may therefore very readily be misled. It is no doubt needless in a medical paper to do more than state that for practical purposes diseases are to be looked upon as alterations in the condition of the whole or of parts of the organism. It is therefore necessary to understand the normal condition of the body before attempting to treat its abnormal states. So close is the connection between these two sets of phenomena that it would appear to follow almost as a matter of course that a thorough knowledge of the latter would succeed at once upon an intimate acquaintance with the former. And in point of fact the extensive and almost complete insight we now possess into disease processes, and which we call pathology, has been obtained almost coincidently with the establishment of Physiology upon a thoroughly scientific basis. In physiology we know tolerably well what are the effects of different diets, and even of different quantities of the same diets upon different persons, and we have a great body of information upon such questions as the action of the heart, the quantity of work it performs, &c.; but what enables us to make a scientific use of this knowledge is, above all, the existence (through the previous labours of the physicists) of a *standard of comparison.* By translating physiological processes into foot pounds we are able to express our results with an accuracy which really leaves little to be desired. It appears to me that before we can hope to place therapeutics in a similar position we must also create for her a standard of comparison which will both enable her to express her results accurately, and will assert her equality with other sciences. The question that at the outset arises for settlement is this: Is there such a standard? Some time ago I pointed out in a short letter to a contemporary medical periodical the steps by which, it seemed to me, we might utilize the previous discoveries in physics and physiology in such a way as to advance therapeutics, and I now propose somewhat to elaborate what was there briefly touched upon.

Of all the causes of disease few are more potent, and none more frequent, than exposure to cold. The whole class of inflammations proper—under which term I do not include the specific inflammations which seem to be due to organic matter in a state of change, nor the *irritations* which are properly the effects of foreign bodies—are the direct result of cold. This being so it is to be regretted that the deductive inquiry, what effect a given quantity of cold has on different persons, has not been attempted. Such an inquiry would doubtless have proved useful, and the materials for making it do not lie far away. For the purposes of this investigation, exposure to cold means the abstraction from the body exposed to it of so much heat. I do not here attempt the settlement of so important a question, but will content myself with stating broadly that the quantities of heat which different persons can afford to lose vary considerably. Speaking generally however, medical men are familiar with three different sets of conditions, all caused by exposure to cold. These are—death of the whole organism,—death of a part of the organism (frost bite), and inflammation, which is the reaction after exposure to an uncertain quantity of cold, or, looking at it from the positive side, the abstraction of an uncertain quantity of heat. So far as I know, the measurement of heat-loss which can be sustained without interfering with the equilibrium of the body has never yet been determined. But it is certain that when the inquiry is made it will be found that the quantity will vary according to the strength of the person acted upon. A rough experiment of this nature can be made with great facility. Thus I find that a man weighing 145 lbs. avoirdupois will raise the temperature of a bath containing 12 lbs. of water from 60° to 69° F. without suffering any inconvenience. When the same quantity of water is raised to 72° F. or thereabouts, the same man shivers and is uncomfortable. The amount of heat however which he can afford to lose varies at different times and in different circumstances. Now without laying too much stress on the accuracy of the details of experiments avowedly conducted rather roughly, a principle of some importance is at once asserted, for we have here a means of measuring, and giving some amount of definiteness to the *unit of resistance* of the human organism. The quantity of energy represented by such an amount of heat as will raise 1 lb. weight of water through 1° F. of temperature is 772 foot lbs. or as much as will raise 772 lbs. avoidupois through 1 foot perpendicular. The quantity of energy therefore required to raise 12 lbs. of water from 60° to 69° F. is represented by the following simple calculation—

$$\frac{12 \times 9 \times 772}{2{,}240} = 37 + \text{ foot tons of energy.}$$

Similarly the quantity of energy required to raise the same quantity of water through 12° F. is—

$$\frac{12 \times 12 \times 772}{2{,}240} = 50 \text{ foot tons nearly.}$$

My reason for taking heat and cold as illustrations of therapeutical agents is the double one—that they are both the causes of disease, and, when judiciously applied, powerful remedies. In addition there is the great convenience in using them that we are not compelled to enter upon new and laborious investigations in physics, but can make use of those mathematico-physical calculations already worked out with so much accuracy.

The remarks which I have made so far are intended to lead up to two statements which appear to me to have the force of Laws of Nature, and which I shall now proceed to formulate.

A. Different remedies tend to act upon different parts of the human economy.

B. The effects of remedies are proportional to the quantities in action, and inversely as the resistance of the persons acted upon.

It is unnecessary to spend any time on the proof of proposition A. Every medical man knows that belladonna acts upon one set of tissues, arsenic upon others, castor oil upon still others, and so on. The reason why these remedies act differently is now and probably will be always classed among those inexplicable phenomena which are called ultimate facts. But although the truth of the proposition is almost self-evident, its practical application is of the utmost importance. If the much debated doctrine of specifics ever obtains practical value, it appears to me that it will do so only when medical men have thoroughly mastered the selective affinities of remedies, and when they administer them because the remedies tend to affect particular parts. How very important this doctrine has been in the history of medicine every student of the art knows. In the *Advancement of Learning* Bacon over and over again complains that medicine has not discovered specific remedies for particular diseases. Thus he writes: "I find a deficience in the receipts of propriety respecting the cure of particular diseases." Again in the Latin edition he says: "They" (the physicians) "have no particular medicines which by a specific property are adapted to particular diseases." And again: "The part of physic which treats of authentic and positive remedies we note as deficient." Quotations to this effect might be multiplied. Shortly after Bacon wrote, the cure of ague by cinchona bark was introduced. But not only did a great general thinker like Bacon hold this doctrine. A great specialist like Sydenham thus expresses himself. Speaking of intermittent fevers, he says: "We must do one of two things; we must by careful and anxious observation of the processes *by which Nature relieves herself of this disease,* draw indications as to the manner by which the incipient fermentation may be promoted, and the patient restored to health; or else *we must discover a specific.* By the latter method we attack the malady directly." It may not be out of place to make here a few remarks on the doctrine of specifics; for although it is the fashion in some quarters to run it down as totally unreasonable, a cautious man will be chary of doing so when he finds the doctrine supported by names so eminent as the two just referred to. I would fain know the reason why aconite, which is specific in the early stages of the simple acute inflammations, is useless in inflammations due to organic matter in a state of change (specific inflammations) and in fevers. The reason appears to me to be this: Aconite has a selective affinity (specific action) for the involuntary muscular fibre of the capillary vessels and of the heart. These tissues are congested in inflammations, in specific inflammations, and in fevers. But in the simple inflammations there is merely a change in the condition of the tissues—an altered blood-supply; while in the specific inflammations and in fevers there is, in addition to the alteration of blood-supply, a complex state present, produced by the combination of the organic matter in a state of change, which causes these affections, with the tissues themselves. Aconite is competent to alter the simple condition, but is not so to affect the complex state present in the latter diseases. I do not despair of our being able by and by to cure both specific inflammations and fevers; at least I do not think it impossible; but if we ever succeed in doing so, it seems to me that it will be rather by a mastery of the reasons why vaccination affects smallpox than by an investigation into those which enable aconite to affect simple inflammations.

If Proposition A is nearly self-evident, the same is by no means the case with Proposition B. It, together with Proposition C, which I shall state immediately, have been the battleground of the sects for a very long time past. It should be observed in the first place what are the exact terms of the proposition. "Quantities in action" does not necessarily mean quantities administered, and the choice of the expression is purposely made to cover those cases in which very noticeable effects are produced by the administration in dilution of quantities of a remedy which in the solid form might be followed by little or no effect. It is now a long time since it was first pointed out that the administration of a grain of belladonna dissolved in a considerable quantity of water is followed by effects which are simply non-existent when the same quantity is given in the form of solid extract. I have myself seen salivation induced by the continued administration of $\frac{1}{1000}$th of a grain of the bichloride of mercury three times a day, when no such result has followed doses of $\frac{1}{16}$th of a grain to a much larger gross amount. In these cases the quantities are no doubt administered, but not being absorbed they do not act. In order to examine whether the effects of remedies are proportional to the quantities in action it is necessary to consider this proposition along with the next.

C. All remedies whatever which affect the economy exert upon it at least a twofold and contrary action in time. If these be called action and reaction, or primary and secondary, we may otherwise state this proposition in the following form: the secondary action of any and all acting remedies is contrary to the primary.

If the effect of remedies were not proportional to the quantities in action, but if, as some say (or imply without distinctly stating it), the effect of small doses were contrary to the effect of large ones, the inquirer into this department of nature would find himself face to face with a set of phenomena which would have no parallel elsewhere. The further question would then arise—Under what quantity is a dose to be considered small, and over what is it large? and at what particular point does the dose change its action? I do not, however, lay much stress on these theoretical considerations, although I must say I think the questions unanswerable; since in the first place facts, if they are such, must be accepted, however inexplicable or unique; and in the second, it is always much easier to ask than to answer questions. There is, however, a large body of facts which give colour to the opinion that small and large doses have contrary effects. For instance, it is undoubted that small doses of ipecacuanha will stop certain kinds of vomiting, while everyone knows that children can be made sick by teaspoonful doses. The effect which it is desired to obtain when considerable doses of castor-oil are administered is the contrary of that which may be produced by doses of a few drops. And so on.

For the proof of the twofold and contrary action asserted in Proposition B we have not far to seek. The reaction after the depression caused by exposure to cold (inflammation) is an example of it. So is the glow of warmth after a cold bath. Such also is the fever which succeeds the collapse due to injury, and the general congestion succeeding the primary depression caused by the reception into the body of organic matter in a state of change. I should like also that any man who denies the truth of this law would explain why it is that after the body-temperature has been elevated in the pyrexial disorders, it sinks *below* the normal before it again returns to it. In the at least twofold and contrary action of agents upon the economy, we have an explanation of the fact, but if we cannot refer it to this principle, what other is there capable of explaining it?

In the region of Materia Medica, examples of this principle are also numerous and indeed unfailing. Aconite first contracts and secondarily dilates the walls of the capillary vessels. This secondary dilatation has been called by some fever, but this is an abuse of language. Arsenic first causes spanæmia of the stomach and small intestine, and secondarily it causes hyperæmia of the same, which manifest themselves in vomiting and diarrhœa. Purgatives in general first cause excessive action of the mucous membrane of the intestines, showing itself in diarrhœa, and secondarily diminished action showing itself in constipation. And so on through the catalogue.

From what has already been said it will be evident that there is first a *real* contrariety in *time* between the primary and secondary action of any active quantity of any remedy. In the next place it is plain that when the quantity administered is considerable, the *original action* escapes notice, because the *reaction* which soon succeeds lasts longer and therefore necessarily obtrudes itself upon the attention of both doctor and patient. Thus *fever* in the popular mind, and in the medical mind, is associated with congestion and heat production, but this is properly the *reaction* of fever; the original malaise and depression, with the subsequent spanæmia, both passing out of notice, although both are essential features of the state. I am convinced that it is because they failed to realise this principle, and confined their attention to symptoms, that Hahnemann and his followers have been led away by a phenomenal contrariety between the effects of large and small doses, and have advanced a hypothesis that is altogether untenable. It is because the *action* of aconite is contrary to its *reaction* that that drug is useful in the simple inflammations, and not by any means because the action of large and small doses are really contrary to one another. It would be as rational to argue because small quantities of alcohol excite, while large ones cloud, the intellect, that therefore the action of small was really contrary to that of large doses. He would indeed have made but a superficial inquiry into his facts who did not recognise that a certain amount of paralysis of the vaso-motor system increases the rapidity of the blood-supply to the brain, while a more thorough paralysis causes congestion and stasis.

(*To be continued.*)

# A CASE OF INTESTINAL OBSTRUCTION,

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# IN WHICH ABDOMINAL SECTION WAS PERFORMED BY W. MacCORMAC, F.R.C.S.

The treatment of intestinal obstruction by the operation of opening the abdomen, searching for the cause of obstruction, and if possible relieving it, has as yet been tried in so few cases that its value as a remedial measure cannot yet be determined. The gravity of the operation, the uncertainty which must always exist both as to the exact nature and seat of the obstruction, and more than all the doubtful issue even if the obstruction be found and relieved, usually prevent the physician from counselling, and the surgeon from performing, the operation until the patient is *in extremis.* But no one will deny that there are many cases in which operative interference can alone give relief, that in a certain number of cases it is easy to find and relieve the obstruction, and that the sole or main risk which the patient runs is that of peritonitis. Nor, until a considerable number of such cases have been so operated upon, before peritonitis has set in, or the obstructed bowel has undergone such changes as to prevent its recovery, will it be possible to estimate the value of the operation of abdominal section in internal strangulation.

In the present state of our experience it seems to be a duty to place on record all cases, whether successful or no, which may throw any light upon the subject, or serve as a warning in future cases. The present case is an example of the dangers of delay, however short, when the diagnosis has become tolerably clear. It shows, too, how readily an otherwise fatal strangulation may be relieved by operation.

The patient, a man 60 years of age, was admitted to St. Thomas's Hospital, under my care (in the absence of Dr. Murchison), on August 5th, 1877. But little information was gathered as to his previous history, and that little did not throw much light upon the case. He was married, had eight children, and gained his living as a street musician. Up to the time of his attack he had enjoyed fair health, though not strong; and he had never suffered from any similar symptoms previously.

On the night of Tuesday, July 31st, he went to bed in his usual health, but woke at 2 A.M. on August 1st with severe pain around the navel, more especially towards the left side. This pain, as he described it, was not of simple colicky nature, but was severe, occupying a limited area, and distinctly localized in a region just to the left of, and slightly above, the umbilicus. In a very short time he began to vomit; the exact period could not be ascertained, but it was within an hour or less from the onset of the pain. This vomiting continued at frequent intervals; was aggravated by food or drink, but occurred independently of it. The bowels were scarcely open at all before admission—no very exact information on this point could be gathered from the patient; but it seemed probable that they were open once or twice slightly. The little fluid which he took consisted chiefly of milk and limewater. His wife noticed that he passed very little water from the time of being taken ill. These symptoms persisted with but little change during the four days which preceded his admission, the principal alteration being that the pain considerably abated, though it did not entirely cease.

He was admitted at 11 A.M., on Sunday, August 5th, and I saw him at about 12.30 noon. A rather tall, spare man, looking about 55 years old, not well nourished, but with no notable emaciation, very intelligent, with an aspect of slight distress, apparently due rather to the discomfort of vomiting than indicative of serious internal affection. He sat up in bed without any discomfort. Skin cool, hands and feet rather cold, lips very slightly bluish, these facts being attributed to the effect of removal to the hospital. Pulse 90, regular—temp. 98°. Tongue clean, moist, pink. Vomits frequently, but in very small quantities (only a teaspoonful at a time), thin light brownish fluid, nearly clear, but with a few small brownish flocculi deposited on standing; odour very slightly offensive and sour, but not distinctly stercoraceous. The abdomen but little, if at all abnormal in appearance, neither obviously distended nor retracted; walls thin and flaccid. Respiration abdominal but shallow. There was an entire absence of inequality due to distended coils of intestine, the surface was of the normal smoothness and uniformity. No tenderness on slight pressure at any point, nor for the most part on deep pressure or manipulation, but on firm pressure over a limited area to the left of and slightly above the level of the umbilicus the patient complains, and evidently suffers, severe pain, which nearly ceases when the pressure is discontinued. In this position, too, there is a certain feeling of slightly increased resistance, but no tumour can at any point be discovered. Abdomen generally resonant, perhaps at this part slightly less so, but with no marked difference in degree. No sign of hernia in the usual positions, no enlargment of glands in groin. (The rectum was afterwards carefully explored by Mr. Nicholson, the House Surgeon, who reported that there was no sign of cancerous growth.) An enema of olive oil had already been given and had brought away a small quantity of dark fluid fæces.

As the patient had been in the hospital less than two hours, and there were no urgent symptoms, nor any marked prostration, the idea of immediate operative interference did not suggest itself to me. I therefore ordered half a grain of opium, and one grain of extract of belladonna in pill every three hours, an enema, and iced beef-tea and brandy in small quantities by the mouth.

Monday, August 6th, 11 A.M. Patient is decidedly more prostrate, vomits frequently, but in very small quantities, fluid of the same character as before, or of rather yellower colour. He appears slightly drowsy, pupils not at all contracted; is said to have vomited all the pills immediately on taking them. Extremities colder and hands slightly blue; pulse more feeble, rapid, and small—about 108 per minute; temp. last night 99°, this morning 98°; tongue slightly dry; patient now lies down, does not sit up as yesterday. No urine has been passed since admission, and there does not appear to be any in the bladder. Three enemata have been given, but with no effect. The abdomen is now slightly fuller than yesterday, but entirely free from sign of distension, and no appearance of distended coils of intestine. Pain has now entirely ceased; but on pressure there is tenderness in exactly the same position as before. No other change in the physical signs, and no drawing up of knees. Reflex vermicular movements not too readily excited.

There now appeared but little doubt as to the nature of the case, and I diagnosed, on grounds which will presently be set forth, an obstruction probably by torsion or by a constricting band, situated high up in the small intestines. Judging, moreover, that no other means than surgical could relieve the patient, I decided to call in the aid of Mr. MacCormac, with a view to operation if he thought it expedient. But, owing to unforeseen circumstances no consultation could be arranged before 9 P.M., nor indeed did there seem to be any urgent haste for the operation. Meanwhile suppositories containing one grain of opium were ordered every three hours, and nutrient enemata every four hours.

At 3 P.M. Dr. Bristowe kindly saw the case. He agreed in the probability of the diagnosis, but suggested that a very large injection should be administered by means of a long tube before anything else was attempted. This was accordingly done, a large quantity of gruel being injected, a considerable portion of which was for some time retained; but no relief followed.

At 9 P.M. Mr. MacCormac saw the patient. He was now very prostrate, vomiting much less frequently and in very small quantities, but he had some hiccough. The pulse was small, rapid, and flickering, at times almost imperceptible. The abdomen was slightly more distended, and there was evident though not marked distension of coils of intestines. Mr. MacCormac fully concurred in the diagnosis, and in the importance of immediate operation. In view of the extreme prostration of the patient, there appeared indeed some doubt whether he could survive the shock of the operation, but the fatal issue was none the less certain if nothing were done; and it seemed only right to give the patient the chance afforded by an operation. An enema of brandy and ammonia was given, and an intravenous injection of half a drachm of liquor ammoniæ, properly diluted, was also made. Some delay was experienced in making the necessary preparations for the operation, which did not take place till nearly 10.30 P.M.

Mr. MacCormac has been kind enough to furnish the following account of the operation:—

" Having met Dr. Greenfield in consultation in this case, under the circumstances he has detailed, I arrived at a precisely similar conclusion as to the nature of the affection. We were informed that since mid-day the man's condition had rapidly become worse, and when I saw him he appeared in an almost collapsed state. The symptoms seemed to me to indicate a very acute strangulation of the small intestine, with incipient peritonitis. Coils of distended small intestine were traceable through the abdominal parietes, and local tenderness could be made out a little to the left of the umbilicus. The history, the patient's condition, the character of the vomiting, all the symptoms, in fact, seemed to make the diagnosis a clear one. Whether it were not too late to do any good by an operation was the only question which arose. As it was clear, however, that the patient must succumb if left to himself, and there was nothing in his condition absolutely forbidding operation, I considered it my duty to afford him the chance of relief an operation gave, however slight that might be. Ether having been given, a median incision was rapidly made through the abdominal wall, nearly three inches in length, the umbilicus being in the centre of it. After dividing the peritoneum on a director, a coil of distended small intestine came into view; this was traced downwards, and a constricting band almost immediately discovered, a little to the left, and below the umbilicus, apparently connected with the mesentery. I easily tore this through with the finger, and a strangulated loop of gut, with the seat of constriction deeply marked on its surface, very dark purple in colour, but of glistening surface, appeared in the wound. The intestines did not protrude, there was no difficulty in the operation, and the seat of constriction was discovered without delay. So far as the surgical procedure was concerned, its aim was most speedily and successfully accomplished, but the patient died before he could be removed from the operating table. Artificial respiration, and intravenous injections of ammonia, with other restorative measures, were tried for some time, but without effect.

The record of this case is, in a sense, encouraging, and one cannot regret that an operation was performed, because the correctness of the diagnosis was verified *ante mortem*, and the seat of constriction discovered and relieved with much facility. The practical difficulty in these cases is doubtless that of arriving at a sufficiently precise diagnosis, but where this can be done, the aid of the surgeon, to be effective, must be early rendered. Cases of internal strangulation do not form any exception to the rule universally accepted with regard to strangulated hernia, and the experience surgeons have acquired in recent years proves that the peritoneum may be opened with an impunity which was formerly deemed impossible. When, therefore, a diagnosis of internal strangulation has been arrived at with a sufficient degree of certainty, the condition is one which too often admits of but small prospect of spontaneous relief, and surgical assistance should be at once resorted to. I have scarcely known a case of strangulated hernia recover after operation, when peritonitis had previously declared itself. Hence I should also deem it imperative to operate in cases of internal strangulation before the occurrence of peritonitis, where this is practicable.

A *post mortem* examination was made at 9 A.M. August 7th, ten hours after death, by Mr. MacCormac and myself.

On opening the abdomen the upper part was seen to be occupied by slightly distended coils of small intestine, the omentum being slightly drawn up towards the right side. Occupying a position just below and to the left of the umbilicus was an intensely congested loop of small intestine, which, when unfolded and separated from the mesentery, measured about six inches. At either end of this loop was an obliquely transverse pale line, the mark of the constriction. The strangulated loop was of dark purple colour, from intense congestion, but not yet sloughing, it felt thickened, firm, and fleshy, compared with the rest of the bowel. The corresponding portion of the mesentery was also intensely engorged, and there were ecchymotic patches scattered over other parts of mesentery adjacent. On close inspection very slight incipient peritonitis was seen in the neighbourhood only of the strangulation. The peritoneal cavity contained about 2 ounces of port-wine-coloured fluid. The small intestine below the seat of strangulation was contracted and empty, but not tightly contracted or notably pale; that above was distended and filled (as also the stomach) with thin, peasoupy fluid of ordinary stercoraceous character.

On very careful search no sign of the constricting band could be discovered. Some portions of the omentum looked thickened and pinkish, and as if torn across, but no other condition could be found to give rise to the strangulation. On removal and opening of the bowels the upper extremity of the strictured portion was found to be exactly six feet from the pylorus. The whole of the tissues of the strangulated loop were intensely engorged with blood, the valvulæ conniventes especially engorged, and presenting some superficial erosion of the mucous membrane, forming yellowish-white lines.

The liver, spleen, and kidneys were healthy. The pleuræ were healthy; lungs very emphysematous, the trachea and bronchi filled with brownish, frothy fluid. The right side of the heart was filled with dark blood-clots, the left ventricle contracted and empty, the muscular tissue showed fatty degeneration under the microscope. No other morbid appearances of importance were noted.

The case illustrates very forcibly the importance of operating as early as possible when the nature of the case is decided or probable. But since in all such cases the diagnosis both of the nature and seat of the obstruction are of the highest importance, I may briefly discuss the grounds on which the diagnosis was based.

The diagnosis made was that of an obstruction of acute character (probably by torsion or band rather than intussusception) situated high up in the small intestine. The grounds of this diagnosis (none of them indeed alone decisive, but taken together very strongly pointing to it) were—the sudden onset; the severe pain and its position and persistence; the early and continued vomiting, which, however, appeared to be only of the contents of the upper part of the bowel; the absence of notable distension of intestines or abdomen; and the suppression of urine. These appear to be the most important.

*Pain.*—It is well known that the pain in intestinal obstruction, if the obstruction be at all acute, is usually referred to the umbilical region, whatever the seat of the lesion. But here we had to do not with an ordinary pain, but with distinctly localised pain, increased on pressure, and made to recur by pressure after it had nearly gone. The position of this pain, and of the apparent slight swelling which accompanied it, rendered it probable that neither the lower part of the ileum nor the ileocœcal valve were involved.

*Vomiting.*—The early occurrence of vomiting is related perhaps rather to the suddenness and severity of the obstruction than to its position. But other things being equal, early and severe vomiting is more likely to occur when the obstruction is situated high up than when low down. But of perhaps greater importance is the fact that the vomit became very scanty even before admission, and that its characters were not those usually observed when the lower part of the small intestine is the seat of obstruction; and that supposing the strangulation to have been severe enough to cause so early vomiting, the other symptoms would by that time have been much more severe.

*Suppression of Urine* has often been regarded, since Dr. Barlow first drew attention to it, as a sign of the high position of the obstruction. The view which is now more commonly advocated, and which is endorsed by Dr. Bristowe in his article in Reynolds's "System of Medicine," is that suppression of urine is rather a sign of severe and sudden obstruction. It would therefore be presumptuous in me to offer any opinion against such distinguished authority; but I must confess to a bias towards the belief in the accuracy of Dr. Barlow's observations, whatever explanation may be given of the facts. Thus much I may add, that I have never seen, either in strangulated hernia or in intestinal obstruction, so complete a suppression of urine as in the present case, nor have I ever seen an obstruction so high up in the bowel. It has appeared to me that whilst suppression or retention for twenty-four to forty-eight hours is not uncommon when the obstruction is low down in the small intestine or in the cæcum, sigmoid flexure or rectum, there is very rarely any actual suppression for so long or at so late a period as in the present case.

But by far the most valuable and decisive indication of the high position of the obstruction, was the almost entire absence of general swelling of the abdomen, and of visible distension of coils of intestine. This was indeed so remarkable that doubts were expressed by good and competent observers as to the reality of the obstruction; they were inclined to consider that the vomiting was due to colic or some other cause when the patient was admitted. Nor until a few hours before death could any decided swelling of the abdomen be perceived; it would even then have been very questionable but for the furrows caused by coils of intestine. Relatively speaking there was at no time any tumefaction. This fact, conjoined with the other symptoms, led me to believe that the obstruction was even higher up in the bowel than it turned out to be; it was, I think, almost conclusive as to the fact of its being high up.

It may be urged that an incomplete nipping of the bowel, comparable to incomplete incarceration of a hernia, might give rise to similar symptoms; but, no actual obstruction existing, the intestine above would not become distended until the onset of peritonitis. Granting that this is a possible source of fallacy, I doubt whether it is applicable to the present case, on the ground of the severity of the symptoms.

The discrimination of the cause of the obstruction is of unquestionable importance from the point of view of operation. For it may be questioned whether if intussusception were found it would be justifiable to release it after it had caused acute symptoms for five days, and probably existed much longer. This question was indeed raised, and I had the support of Dr. Bristowe in my belief that an intussusception so high up in the bowel was very rarely found as the cause of acute obstruction in the adult, and that its possibility need not be a bar to operation.

As to the operation selected, it is not in my province to speak. But I may point out that the operation of enterotomy, as described by Trousseau, was quite inapplicable in this case, and that no other operation than that so ably performed by Mr. MacCormac would have had any chance of success.

# WHEN NOT TO GIVE IRON.

BY J. MILNER FOTHERGILL, M.D., M.R.C.P.

*Assistant Physician to the West London Hospital, and to the Victoria Park Hospital for Diseases of the Chest.*

The conditions which call for the administration of iron are *par excellence* those where debility is combined with anæmia. In these conditions iron acts as a general tonic as well as increasing the number of the red-blood corpuscles. But there are certain circumstances which contraindicate the use of iron, and which are deserving of note and remembrance. It is not enough to say that in conditions of plethora and vascular fulness iron should not be given. There are other conditions in which it is well to resort to other tonics, and even to other remedial agents altogether. Pereira says that the contra-indications are "great strength and activity of organs, excessive tonicity (characterised by a firm and tense condition of the solids), and redundancy of the red corpuscles of the blood—as in general excess of the blood (plethora), in fever, in acute inflammation, and in the sanguine temperament. To these may be added, congestion, or a tendency thereto of important organs, especially of the brain and lungs, and intestinal irritation." Again he says "administered in large quantities, or when the alimentary canal is in an irritable condition, all the compounds of iron are liable to excite heat, weight and uneasiness at the precordia, nausea, and even vomiting, and sometimes purging."

From the well-known action of iron in increasing the red-blood corpuscles no one would now think of giving iron in states of vascular fulness. It is unnecessary to say anything further on this subject. Then again conditions of vascular excitement are unsuited for the exhibition of iron. As long as there is rapidity of pulse combined with rise of temperature, so long must iron be withheld in the treatment of acute disease. When the convalescence is well established, when the pulse may be fast and small, but is without excitement; when the temperature is perfectly normal or below it; when the skin is cool, the face pale, and the tongue clean, then, and not till then, should the administration of iron be commenced. If it produce any gastric disturbance, or headache, or feverishness, it should either be totally abandoned for a time, or the dose be much reduced. Vegetable tonics, as quinine or strychnine, together with mineral acids, the hydrochloric, the phosphoric, or the hydrobromic even in some cases, should be given instead; and then the iron, in small doses at first—to be taken after meals, especially dinner. So administered iron can often be tolerated, when it disagrees given in the usual way in combination with the vegetable tonics. The same rule holds good of the resort to iron when the pyrexial stage of ordinary phthisis has passed away. The tonics and acids must be given before food, and the iron after, either as the tincture of the muriate in acetate of ammonia, the carbonate, or Niemeyer's pill of sulphate of iron with carbonate of potash in a drop of syrup. But as long as the tongue is thickly coated, or red and irritable, it is well to withhold chalybeates altogether.

This is very true of phthisis. However much the general pallor, the lack of tone and loss of power seem to call for iron, it is useless, and sometimes worse than useless, to give it unless the tongue be clean, without irritability. If the tongue be red and irritable, bitters with bismuth are to be adhered to, until all intestinal irritability has passed away, of which the condition of the tongue is the best index; if the tongue is loaded with fur, bitters and acids are to be preferred with a little sulphate of magnesia, or a vegetable pill at bedtime; or both if necessary. The gastro-intestinal canal must be got into a normal condition, neither too irritable, nor sheathed with a layer of epithelium, as indicated by the fur upon the tongue, before either chalybeates or cod-liver oil can be satisfactorily prescribed. About this my experience at the Victoria Park Chest Hospital constantly makes me more and more positive.

In ordinary convalescence from acute conditions it is well to commence with the lighter preparations, the ammonia-citrate, the tartrate, or the citrate of iron and quinine; afterwards the muriate or the sulphate will be tolerated equally well. But these latter forms often disagree during the early stages of convalescence. At times too the mixture of the sulphate of iron, with quinine, and a few drops of dilute sulphuric acid, is found to be heating, and each dose to make the patient uncomfortable, especially in warm weather; here the addition of a little sulphate of magnesia, not necessarily to the extent of producing purgation, will at once remedy the uncomfortableness so induced.

In atonic gout also iron is commonly of no service, and makes the patient uncomfortable. In the sanguine and plethoric forms of gout iron is never indicated. But where there is evidence of chronic renal disease with anæmia, and even with albuminuria, then it commonly seems desirable to administer iron in some form. Very often, however, it distinctly disagrees. It is well to see that there is no acute action going on anywhere, that the joints are cool, even if still enlarged, before commencing with chalybeates. The bi-carbonate of potash, or the potassio-tartrate of soda, with a little nux vomica, in infusion of buchu, with a liberal draught of water after each dose, are the medicinal agents to be adhered to until all is perfectly quiet. When the tongue is clean, the skin cool, and there is no evidence of much acidity, then small doses of iron may be commenced with. But for some time the iron and the potash should be taken together; if the potash is left off the iron disagrees. Especially is this the case with elderly persons. It may be laid down as a broad rule that the toleration of iron diminishes as the age increases. With old persons iron comparatively rarely agrees, and then only in very small doses: while young children take iron well, and it often is well borne by them in conditions which in the adult distinctly forbid its use. But as age advances the system seems to grow less tolerant of the drug in any form; and the dose must be much diminished. In advanced life, in convalescence after acute disease, or paroxysms of gout in any of its forms, chalybeates have often to be abandoned, and alkalies, as potash or ammonia, with vegetable tonics and bitters substituted in their stead. It would seem that the power of the digestive organs to assimilate iron is strongest in infancy—except it be very young children and babies—and that it diminishes, until in advanced life the blood manufacture often appears to be interfered with rather than assisted by chalybeates. Consequently with old people it is often better to give them tonics with alkalies and easily digestible food, than to give iron, when it becomes desirable to give a fillip to their nutritive processes.

There is one condition where iron is absolutely forbidden, and that is the condition known as biliousness. As long as there is a foul tongue, a bad taste in the mouth, and fulness of the liver, with disturbance of the alimentary canal, iron is to be prohibited ; it is not only that it is of no service, it positively does harm. It aggravates all the symptoms, and intensifies the condition. Iron undoubtedly increases the oxidising processes, but somehow or other in biliary disorders it does not suit. Defective oxidation is at the root of these states, and yet iron does not agree with such patients. As long as any of the symptoms remain, and there is any fur whatever on the tongue, iron must be withheld. The patient may be anæmic and iron seem to be urgently indicated, but it will do no good until the system is in the proper condition to receive it. Sir Joseph Fayrer's Indian experience is in full accord with this expression of opinion. He kindly furnished me with some notes on Indian and tropical maladies for my recent work *The Practioner's Handbook of Treatment*, and in speaking of the treatment of hepatic congestion accompanied by anæmia, he lays stress upon the resort to purgatives and vegetable tonics, and the avoidance of iron, until the biliary congestion is removed. "*When the portal circulation is relieved* some preparation of iron may be useful." (The italics are his, not mine.) The liver must be thoroughly unloaded by alkaline salines first ; then some strychnia and nitro-muriatic acid may be taken in the day, the salines being only taken first thing in morning ; and ultimately, when the liver is once more working efficiently, chalybeates may be prescribed. But it seems that the oxidising power of iron embarrasses rather than aids the liver when working inefficiently ; and when iron is given, the morning purgation by salines, mineral waters, or other means, should still be maintained. By attention to these points much may be done for bilious patients; aye! and much discredit avoided. Whenever, indeed, there is disturbance of the gastro-intestinal canal, bilious or other, chalybeates are contraindicated, and if given cause discomfort, nausea, and not uncommonly a pyretic condition. The digestive organs must be got into good working order before iron is administered if it is to be properly assimilated. When given in large doses iron always blackens the stools, but if given in moderate doses and well assimilated this blackening of the stools is not so marked. The colour of the stools, then, may be utilised as an indication as to how far chalybeates are assimilated and are likely to be useful.

There are two different states found in women where iron is either totally contraindicated or to be given with great caution. The first is the condition of amenorrhœa in florid, plethoric persons. In such cases, especially if the patient be of tense fibre, depletory measures are to be resorted to, as local bleeding and free purgation. The other is the opposite condition of menorrhagia in certain females. Of course no one would think of resorting to any form of iron, however astringent, in those cases of menorrhagia which are due to a state of general plethora. But there are cases of menorrhagia associated with pallor and debility, where the usual compound of iron and extract of ergot is not so useful as is a non-chalybeate treatment. In these cases it is not any imperfection in the processes of blood-manufacture which is to be remedied, for the blood is made rapidly and quickly, only to be lost at each menstrual period. An irregular process of rapid blood-making with still more rapid blood-loss is established, and requires its appropriate treatment. It is undesirable to stimulate blood formation by chalybeates here, for the greater the increase in the bulk of the blood, the more excessive the catamenial loss; and to give iron is but to aggravate the condition. It is here desirable rather to limit the rapidity of the blood formation, so that when the general vascular turgescence of the menstrual period comes, it will not find the blood-vessels too distended with blood. This will lead to diminished catamenial loss, and so the blood-waste will be economised. For in these cases it is the proper practice to lessen the loss rather than to stimulate blood-formation. During the interval a little sulphate of magnesia, with dilute sulphuric acid, in some infusion of a vegetable astringent forms an appropriate medicinal agent, and should be given along with a restricted dietary. At the periods the dose might be increased and the patient kept quiet, while all aliment should be cold. By such a plan the irregular condition of rapid blood-formation and blood-loss will be converted into a steady state of slower blood-formation with diminished loss. The same rule holds good of other periodical hæmorrhages, and especially of some forms of hæmoptysis.

Even in cases of menorrhagia where it is necessary to encourage blood-formation during the interval, it is often well to cut off the chalybeates a day or so before the menstrual molimen, and to substitute for it the mixture just mentioned above. By such plan the blood-waste by the catamenia is economised, and the necessity for great blood-formation minimised. "There is poverty from waste and poverty from want," as Dr. Mitchell Bruce pithily puts it, and each requires its own appropriate treatment. At times with women there is both, and then combined measures are required.

Finally, the consideration of iron here is confined to its use as an hæmatic, its use in pyrexial affections as erysipelas or scarlatina not being included. When used as an hæmatic, it is clear that certain points must be kept in view. First, that the digestive organs be in fair working order, and second, that certain precautions be taken as to its administration when it is necessary to resort to it.

Since writing the above, Dr. Hughlings Jackson tells me that at one time he did not acquiesce in Brown-Séquard's idea, that iron does not suit epileptics, but that a more extended experience has convinced him that it is so. When iron is given to epileptics who are anæmic, it may improve the condition of the blood, but that, while doing so, it increases the tendency to fits. It may improve the general condition, but it aggravates the epilepsy.

# AMYL NITRITE IN EXOPHTHALMIC GOITRE.

BY EDWARD T. BLAKE, M.D., REIGATE.

I WAS consulted on the 23rd of April, 1877, by Mrs. L. Q., aged forty-five, the widow of a military officer. She has lived nineteen years in India, whence she has just returned. She has light hair, is of spare habit and medium height. The face is flushed and sunburnt, the eyeballs, especially the right, are very prominent, giving to the patient the appearance of being half strangled.

The neck is thin, the jugulars full, the throbbing of the carotids plainly visible.

The right lobe of the thyroid is much enlarged, the left less so.

Her *medical history* has not been very eventful. She had chicken-pox, measles, and whooping-cough before the age of ten.

The catamenia appeared at sixteen, preceded by languor and "fainting-fits."

She married at the age of twenty-six.

At twenty-eight and twenty-nine she suffered much from "diarrhœa" and "fever" (dysentery and paludal fever).

Soon after this she lost her husband, and growing weak and thin, she came home, being then thirty years of age.

In October, 1875, aged forty-three, had rather severe uterine hæmorrhage for ten days, and from that epoch she dates her illness. She says in her own notes of her case: "From that time I have never been quite well; I have always felt tired; I have been troubled with incessant thirst, with little appetite for food."

The periodic flow finally left her at the close of 1876.

During the last four or five years, there have been occasionally piles, and sometimes vulvar *pruritus.* The memory has been certainly impaired for the last twelve months.

In July, 1876, she first perceived a swelling on the right side of the larynx, and soon afterwards she found the left eyeball becoming protuberant. Ere long the left lobe of the thyroid began to enlarge, this was followed by prominence of the right eye.[1]

She sought advice, the neck was rubbed with *Ung. Iod.*, and afterwards *Emp. Bellad.* was applied, but without much benefit.

Falling of the hair over the optic apparatus was not present in my case; but a peculiar condition of the nervous system was very marked. The patient was fluttered and disturbed by the approach of a stranger, and there was much general muscular tremor; this was first observed in the legs in October, 1875; in the arms not till the spring of 1876.

With the exception of her very œdematous legs, she is now much emaciated.

Beyond the failure of memory, so common after the climacteric, there are no mental nor cerebral symptoms whatever; she has indeed taken a desponding view of her case during the last six months, and for the same length of time has observed a progressive impairment of the vision of both eyes.

The face and neck are always flushed, the veins of the forehead especially prominent, and this prominence is not due to mere dilatation; evidently the venous walls have undergone some kind of hypertrophy. There is no photophobia. The sclerotics are yellow and injected.

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[1] This cross method of the eye and gland affection was, I believe, first observed by Dr. Burney Yeo, in a paper read before the Clinical Society on 9th of last March; his paper may be seen in the *British Medical Journal* for March 17th, 1877, p. 320, where there is a capital illustration of a right goître with a left exophthalmos.

In his admirable summary he draws attention to our points:—

1. *The order of evolution of the phenomena.*
2. *The occurrence of unilateral exophthalmos as well as unilateral goître.*
3. *Coincident alopecia of cutaneous tracts adjacent to the enlarged eyeball.*
4. *Important diffused phenomena,* as:—recurrent diarrhœa, profuse perspirations and emotional excitability of the nervous system, so frequently ignored.

The left ear feels "stuffed," but though the heart beats with great force and frequency, she never experiences any species of *tinnitus*. The neck measures eleven inches above the thyroid, and over the gland thirteen inches. The tumours in the neck can be emptied by pressure. The mouth is always dry, and in the morning "feels like a chip." There is follicular pharyngitis, and associated with it, as we so often see in the other sex, the hyper-resonant chest of emphysema. She thus has two reasons for complaining, as she does, of a "dry tickling cough, worse at night."

The area of superficial cardiac dulness is much increased, both vertically and laterally. It reaches from the third to the sixth rib. There is a systolic *bruit* and marked "heaving impulse." The heart beats a hundred and twenty per minute.

After animal food she gets gastralgia, which is relieved by vomiting.

Vertical liver-dulness = 4 in. The bowels act daily, but the stools are pale and clay-like; no diarrhœa.

The spleen is natural.

The urine contains neither sugar nor albumen.

Besides a few scars of old cervical excoriations, the uterus and its appendages are normal in every way, so that the piles, if pelvic in origin, are at present maintained by the portal congestion.

The left arm measures six inches in circumference above the elbow, the right arm six and a half inches.

The legs are very œdematous; she cannot lift them from the ground, but has to raise them by means of the hands; they measure fifteen inches at the calf, ten at the ankle.

The skin, which, with the exception of the head and neck, is generally cold, is prone to itching. She has been subject to severe sweatings since February.

She suffers greatly from the heat. With the exception of dreaming and the cough, her nights are good.

Pulse 120, Resp. 25. Temperature 8.30 A.M. 99·8; 8.30 P.M. 100.

### TREATMENT.

I commenced by absolute rest and seclusion; I forbade all alcoholic stimuli, and put the patient on a fish, egg, and skim-milk diet. Then having got the liver into good working order by a week of podophyllin, I allowed an interval to elapse without medication, in order that I might give a thorough trial to the nitrite of amyl acting alone.

I might say that, during this time, the œdema entirely disappeared under systematic firm *massage,* applied three times a day, by a skilful rubber.

On the 14th May, I began the amyl treatment, giving two drops on sugar half an hour before each meal. Improvement was speedy and most satisfactory, so that I find entered in my case-book on the 20th of May:—"The throbbing in the head is much diminished, eyeballs much less prominent, the lids now close in sleep; the heart is quieter; there is no cough; the œdema of the legs is gone."

Pulse 108. Respiration 20. Temperature 8.30, A.M. 99·4; 8.30. P.M. 99·7.

It will be seen that the pulse had fallen from 120 to 108; the respirations from 25 to 20. The average temperature from 99·9 to 99·5.

The patient felt much subjective relief, but complaining of the severe effect of the two-drop doses, I directed one-tenth of a drop only to be taken half an hour before eating. In order that this might be a test case, I have carefully abstained from the use of adjuncts such as chalybeates, &c., and, as far as possible, from all other disturbing elements.

The patient persists in the steady use of the diminished dose, and she writes after three months of this treatment to say:—"I feel quite well in myself, better even than when I returned to India four years ago."

The neck does not decrease in size absolutely; though the patient is putting on flesh so steadily, that it no longer stands out in bold relief.

It may be said that unless the neck go down, there is no evidence of real improvement from the use of the drug; but I urge that the remarkable subjective relief experienced by the patient is sufficient, had there been no organic improvement whatever, to make the amyl a valuable addition to our very limited therapeutic resources in coping with this interesting though still obscure condition.

1. From the preceding observations it seems probable that the affection of the eyes and thyroid has an accidental rather than an essential relationship to Graves' disease.

2. The heart occupies a more prominent pathological position than has hitherto been assigned to it, though it too will probably prove to be ancillary to some other element.

3. That pelvic disease has no causative relation to the disease of Basedow.

4. That the complaint is emphatically a neurotic one.

# Reviews.

*Clinical Studies Illustrated by Cases Observed in Hospital and Private Practice.* By SIR JOHN ROSE CORMACK, M.D., Physician to the Hertford British Hospital of Paris. J. and A. Churchill. 2 vols, pp. 1114. 1876.

THIS is a collection of the different writings of the author, dating back to a treatise on Relapsing Fever in Edinburgh in 1843. This, with Cholera, Scarlatinous Nephritis, Puerperal Convulsions, and some minor papers, form the first volume. The second volume commences with the author's inaugural dissertation for the M.D. of Edinburgh, on the Presence of Air in the Organs of Circulation. After a paper on Reflex Convulsions in Infancy come three essays on Diphtheria. These papers will probably interest most readers of these volumes. The author holds that "Diphtheria is a malady *sui generis*—a specific, asthenic, general disease. It is contagious, and sometimes occurs as an epidemic," while he states that "croup is a symptom." Then follow some papers on Diseases of the Genito-Urinary organs, &c.

These essays demonstrate that Sir John Rose Cormack is a shrewd observer, and knows his profession thoroughly; and their collection in this permanent form will preserve them from being lost, as they otherwise would have been. His peculiar opportunities, and the manner in which he has availed himself of them, give these essays a value of their own.

*A System of Medicine.* Edited by J. RUSSELL REYNOLDS, M.D., F.R.S., Professor of Medicine in University College. Vol. IV. Diseases of the Heart. Macmillan & Co., 1877, pp. 794.

THE appearance of the fourth volume of this well-known *System of Medicine* has been long delayed for reasons pretty generally known. There is something saddening about this volume, for two of its contributors are dead, Dr. Warburton Begbie and Dr. Sibson; while a third, Dr. Peacock, has been seriously ill, but is now nearly quite well again. The total number of contributors to the volume is but six. The first article is on the Weight and Size of the Heart, by Dr. Peacock, and is exact and careful, like all his work. The writer holds that temporary enlargement of the cardiac orifices may occur, and that this condition may be recovered from under favourable circumstances. The second article, by Dr. Peacock, is on Lateral or Partial Aneurism of the Heart; and the third on Adventitious Products in the Heart. Both are well done. Dr. Sibson is the chief contributor to this volume, and his first article is on the Position and Form of the Heart and Great Vessels. Dr. Sibson was well known for his great clinical acumen and his painstaking diagnosis, so that the appearance of his articles has been long looked for. They display the most elaborate pains and the most persevering assiduity. Some idea may be formed of these articles from the number of pages they cover. The first article extends over 134 pages, and is illustrated by some engravings which are not quite what they ought to be for accuracy. At page 93 is a side view of the heart and vessels, where the ascending aorta is put in front of the anterior axillary fold. By comparison with the plates in Braun's *Topographical Atlas* it will be seen that it is too far forward, though it must be admitted that Dr. Sibson's error is much less than is apparently the case at first sight. In the next plate, at page 102, is given the back view of the heart and vessels, with the descending aorta in front of the heart—an obvious oversight. These mistakes show how easy it is to err, even in the case of a man like Dr. Sibson, whose carefulness was generally rather excessive. The article on Pericarditis reaches over 240 pages, and is a monument of work. It is most elaborate, and consists of records of 326 cases. We must honestly confess that, whatever its merits, this article will be too much for ordinary readers. The tables, with their arrows, symbols, and coloured lines, are a testimony to the skill of the printers of this work, but they must prove a very severe task to the reader who goes conscientiously to their study. This work, however, has its value, and must be studied by all who project writing on the same subject. The final remarks on treatment are judicious. Like the writers in Ziemssen's *Cyclopædia*, Dr. Sibson does not approve of blisters over the heart. The operation of paracentesis of the pericardium is carefully given and considered. Then follows an article on Adherent Pericardium of moderate length, but discussing the subject thoroughly. Endocarditis is given in an article of about seventy pages. The author points out how the force with which the blood presses upon the closed mitral valve is much greater than the force with which the blood presses upon the aortic valves, a point too little borne in mind in the consideration of the production of mitral valvulitis. One of his statements is open to criticism. "A tricuspid murmur may precede a mitral murmur, accompany it, alternate with it, or waken up after it has disappeared. A tricuspid murmur, then, is a friendly sign—it warns you of inflammation elsewhere, and relieves the ill effects of that inflammation. It is a danger-signal, and a brake, lessening the mischief." The evidence given for this seems scarcely sufficient to warrant such a strong expression of opinion. The whole article is replete with observations. It is a pity, however, that Dr. Sibson did not attempt to cast his abundant material into a form which would have rendered it more useful to general readers, for, as it is, few will bend themselves to the task of going through his articles.

The articles by the late Dr. Warburton Begbie are Pneumopericardium, on which there is not much to be said, and on Hydropericardium, on which there is not much more. Though short, they are as good as they can be.

Professor Gairdner's contribution on Angina Pectoris and Allied States: Including Certain Kinds of Sudden Death, is one that deserves and will command careful attention. The pathology of the affection is gone into extensively, and the questions of the relation of the disease to the innervation of the heart, and to the blood-pressure in the arteries, are considered with much acumen. In the treatment of this affection a case where a huge dose of chloral hydrate was given by accident and did great good is related. The author, however, admits that chloral is not suited to most cases of angina. The fact of the value of nitrite of amyl is admitted, but exception is taken to the explanations of its *modus operandi.*

The Diseases of the Valves of the Heart are from the pen of Dr. Hilton Fagge. The pathological change in the valves are described with great accuracy and attention to minutiæ. The diagnosis of each form and the physical signs thereof are cautiously estimated, and the sources of fallacy pointed out. The discussion of the subject of mitral stenosis is especially good. The difficulties connected with prognosis are given, and the conflicting views of various writers contrasted.

The Diseases of the Walls of the Heart are by Dr. W. R. Gowers. Carditis, atrophy, hypertrophy, fatty diseases of the heart, and fibroid disease are each given separately. There is much to be said about the interesting subjects, perhaps the most interesting clinically of all in the book, if space permitted. It may be said that the articles are well done, and are quite equal to any in the book. They demonstrate that Dr. Gowers is a well read, thoughtful, and acute observer, and that the complete subjects which he handles are well grasped by him in their more obscure as well as their more patent phases. The indications for treatment in hypertrophy and dilatation are carefully discriminated. The casual relationships of fatty degeneration are carefully recognised, and their importance in forming a prognosis estimated accurately. Indeed we must congratulate Dr. Gowers on his appearance in a department with which his name has not yet hitherto been associated. Notwithstanding the faults we have already mentioned, and the somewhat undue length of some of the articles, this volume as a whole is worthy of its predecessors, and will sustain the reputation which the work has acquired of being complete without becoming unwieldy.

*Food: its Adulterations, and the Methods for their Detection.* By ARTHUR HILL HASSALL, M.D., London. Illustrated by upwards of 200 Wood Engravings. London: Longmans, Green, and Co. 1876.

THIS book is virtually a dictionary of the adulterations and deteriorations of food with the best means for detecting them, and contains an immense mass of information compressed into comparatively little space. The descriptions are clear, and the remarks upon rival chemical processes very judicious; but the great feature of the book is the attention paid throughout to the use of the microscope, an instrument systematically ignored in many chemical laboratories, though, as Dr. Hassall insists, it holds the first place as a means of detecting fraud in food. The abundant illustrations of the microscopic appearances presented by foods and their adulterants will in many cases enable ordinary medical men familiar with the microscope to act as judges, though possessing neither the apparatus nor the skill needed for chemical inquiry, and thus multiply the checks upon the fraudulent. There is much that is interesting to the ordinary reader relating to the properties and methods of preparation of different foods as well as in the description of various tricks of trade and useful receipts. Dr. Hassall becomes amusing when dealing with chemists and others inclined to be indulgent towards minor adulterations, such as facing tea, and punishes some of them by publishing portions of their evidence before the Parliamentary Committee. His contempt for the scientic knowledge, or rather ignorance, of the Excise, with its seventy chemists and 4,000 inspectors, seems justifiable; but we fail to see the enormous loss to the revenue which he alleges, for would not pure beer, for instance, cost more than watered, and the consumption be correspondingly reduced? There is a chapter on the utensils employed in preparing food, and a general summary of adulteration, in which it is defined and considered under the heads of prevalence, causes, excuses, guilty parties, classification of substances employed, its commercial, sanitary, and moral bearings, discovery, and prevention. After a final attack on the chemical department of the Excise and upon the Sale of Food and Drugs Act, the book concludes by quoting that Act. In the short space at our disposal it was impossible to notice details which we had marked for criticism or praise, but we may direct attention to page 760, where Hassall and Hehner's patent method for deplastering wines is described, and remind the latter gentleman that 85·8 per cent. of fixed fatty acids in butter, as given at page 447, is considerably less than the quantity found nowadays. We sympathize with Dr. Hassall when he contends that everything should be sold under its own name and colour only, and wish his book all success.

# Clinic of the Month.

**Methods of Artificial Respiration.**—Dr. Howard of New York, after describing the usual methods of artificial respiration, and pointing out that in all, three objects are aimed at, viz. : 1, a clear passage through the lips to the lungs ; 2, the greatest possible expansion of the thorax ; and 3, the greatest possible diminution of the thorax—the two latter being performed rhythmically—proceeds to give an account of the method he himself adopts. Supposing a patient to be just dragged ashore and apparently dead from drowning, he instantly rips away his wet clothing to the waist, and makes of it a large firm solid bolster, which he places beneath the epigastrium, making this the highest, and the mouth the lowest point; then placing both hands upon the back immediately above the bolster, he throws his whole weight forcibly forward, compressing the stomach and lower part of the chest between his hands and the bolster for a few seconds two or three times, with very short intervals. Thorough drainage being combined with thorough compression, the lungs, if they require it, are released of water; the stomach, if distended, of its surplus contents, forcible ejection making the process pretty complete. Should this happen to have been superfluous, no time has been lost, an efficient means of respiration having by this process been already commenced. Quickly turn the patient on his back, the bolster beneath it, making again the epigastrium and anterior margins of the costal cartilages the highest point of the body, the shoulders and occiput barely resting on the ground. Seize the patient's wrists, and having secured the utmost possible extension with them crossed behind his head, pin them to the ground with your left hand so as to maintain it. With the right thumb and forefinger armed with the corner of a dry pocket-handkerchief withdraw the tip of the tongue, holding it out of the extreme right corner of the mouth. Fully two-thirds of the entrance of the mouth is thus left free, the epiglottis is precluded from pressure, owing to the backward curvature of the neck, and the head is thoroughly dependent. The free margins of the costal cartilages are as prominent as they can be made, and there is a high degree of fixed thoracic expansion. The epigastrium being the highest point, the abdominal viscera, instead of embarrassing the movements of the diaphragm, tend to gravitate away from it. To produce respiration Dr. Howard goes on to say you now kneel astride the patient's hips, rest the ball of each thumb upon the corresponding costoxyphoid ligaments, the fingers falling naturally into the lower intercostal spaces. Now, resting your elbows against your sides, and using your knees as a pivot, throw the whole weight of your body slowly and steadily forward, until your mouth nearly touches the mouth of the patient, and while you might slowly count one—two—three; then *suddenly*, by a final push, spring yourself back to your first erect position on your knees; remain there while you might slowly count one —two; then repeat; and so on about eight or ten times in the minute. This method Dr. Howard calls the "direct method," and claims for it several advantages over Marshall Hall's or the "postural method," and over Silvester's or the "physiological method." (*Lancet*, Aug. 11, 1877.)

**Death from Chloroform averted by the inhalation of Nitrite of Amyl.**—A correspondent of the *British Medical Journal* forwards an interesting report of a case in which death was averted, apparently by the immediate inhalation of nitrite of amyl. Early in the present month he was asked by a professional friend to give chloroform to a patient of his, from whom he was about to remove a fatty tumour, situated in the left lumbar region. The patient in question was about forty-nine years of age, married, the mother of several children, of thin spare habit, but otherwise in good health. She was nervous, and apprehensive of the result, intreating him not to give her too much chloroform. Having previously examined the heart and found all the sounds normal, she was given two teaspoonfuls of brandy undiluted; and after waiting a few minutes, and placing her in the recumbent posture, the administration was commenced. He poured a measured drachm upon a piece of lint enveloped in a towel; held it some little distance from her mouth and nose, and let her inhale slowly. The pulse was noted, and the respiration watched. The first dose did not produce any effect, and another drachm was used, which soon caused a good deal of excitement, incoherent talking, and struggling—the patient striving several times to snatch away the inhaler. This gradually subsided, and she appeared to be passing into the third stage of anæsthesia, when she made an abortive attempt to vomit, raised her head from the pillow, and to the operator's great alarm, the pulse flickered and stopped altogether; she gave a gasp, foam gathered on her lips, her jaw became rigid, and to all appearance she was dead. The chloroform being immediately withdrawn, some cold water was dashed on her face and her tongue pulled forward, whilst he commenced artificial respiration, but without success. Some nitrite of amyl was poured on lint, and held to her nostrils. In such emergencies it is impossible to judge the flight of time correctly; but he thought in ten seconds there was a flushing of the face, the pulse was again felt, and the all-important function of respiration was again restored; the woman being rescued apparently from the very jaws of death. After a time, the anæsthesia seeming tolerably profound, the tumour was skilfully removed, whilst as the patient grew restless, an occasional whiff of chloroform was given. It proved an ordinary fatty tumour; only one vessel required to be ligatured. The wound healed rapidly, and the patient has made a good recovery. (*British Med. Journal*, August 18th, 1877.)

**Physical characters of the Torpedo Discharge.**—M. Marey, in a paper read before the International Medical Congress held this year at Geneva, refers to the following physiological analogies between the discharge of the torpedo and that accompanying muscular contraction. 1. An electric discharge is made up by a succession (flow) of minor discharges following each other with immense rapidity. Muscular contraction is composed in like manner of minor contractions. 2. Each discharge lasts about one-fourteenth of a second. 3. The return discharge of the torpedo or its reflex action on the nervous centres lasts about one seventy-fifth of a second. 4. The frequency of the discharges varies from 60 to 140 per second; some are brief, composed of two or three minor discharges only; others are much longer, may occupy seven to eight seconds, and be composed of 800—1,000 minor discharges. 5. The electric shock produced by the torpedo is of a similar nature; the partial discharges unite together, in a manner analogous to the partial contractions of muscles when tetanised. 6. The physical and physiological influences which increase or diminish the intensity of muscular contraction appear to produce similar effects on the electric discharge of the torpedo. (*Medical Examiner*, July 26, 1877.)

**The Treatment of Phthisis.**—In a clinical lecture on the treatment of phthisis, Dr. Charteris of Glasgow took occasion to point out various forms and types of phthisis, and then proceeded to say that in the course of the past half year fifty cases of phthisis had been admitted into his ward, thirty-three being males. Of these fifty, five died, three females and two males. The mortality, he observes, was very small, and the treatment adopted was either by the hypophosphite of lime or soda, or by the hypophosphite of quinine given in three-grain doses. The quinine he thinks has more effect in reducing the temperature, but it is not so well borne by the stomach, producing in many cases vomiting and headache. In addition to the hypophosphites alcohol in the form of whisky was freely given. He believes that whisky, given almost *ad libitum,* soothes the cough without nauseating the stomach, and that whatever theory may say to the contrary, it affords permanent nourishment to the frame, whilst it never aggravates the fever. He has not found brandy so advantageous; it appears to be too heating, and occasions heartburn and indigestion. Port wine and sherry seem to have a similar effect, and he has not had much experience with champagne. Cod-liver oil he never gives in hospital cases; he regards it simply as food, and if under its use ordinary food is not taken so readily, and the weight does not increase, it does not fulfil what is demanded of it, and it should be discarded. When, however, the patients leave the hospital and are able to be much in the open air and to take plenty of exercise, the oil seems to be more readily assimilated, and four or five teaspoonfuls will be taken readily. Its benefits are then apparent. The general health is improved, for it imparts the greatest amount of nourishment in the smallest bulk. For all hospital cases he orders glycerine, and if pure, two ounces daily were always given, the patients stating that it soothed the cough and facilitated expectoration. In addition to these means, Dr. Charteris always orders exercise in the open air unless there be much fog or moisture, and he attributes much of the benefits of foreign places of resort, sea-voyages and the like, to the fact that out-door exercise can then be indulged in with impunity, and with less chance of in any way lowering the vitality. Change of place should not be recommended, however, merely as a *dernier ressort* when every other place has proved unavailing, The loss of the comforts of home is likely to be more trying than the benefits to be obtained from the proceeding. (*Lancet,* Aug. 18, 1877.)

**On the Functions of the Spleen.**—Dr. M. Schiff has arrived at the following provisionial conclusions in regard to the functions of the spleen:—

1. Extirpation of the spleen exercises no durable influence on the quantity of the white or red blood corpuscles.

2. For a limited time after extirpation the number of white corpuscles is greatly increased, while the red corpuscles may or may not remain unchanged. These alterations do not depend on the removal of the spleen; they are connected with the preliminary steps of the operation, and are seen to occur when the first steps have not been followed by extirpation of the organ.

3. Tumefaction of the lymphatic or other glands occurs in

exceptional cases only. The so-called supplementary spleens are not found if the animal be allowed to live for a year and a half after the operation, or if extirpation has been practised a few weeks after birth.

4. The tumefaction of the mesenteric glands observed in a few cases after the experiment seems to depend on a limited chronic peritonitis which sometimes follows the operation.

5. The spleen appears to increase in size between the fourth and seventh hours following the digestion of a copious meal.

6. During digestion, or more properly speaking, during absorption of food by the stomach, the spleen prepares a ferment which enters with the blood into the pancreatic tissue, and there meets a specific substance (probably albumenoid) which it transforms into pancreatic pepsine, that is to say, a substance capable of digesting albumenoid matters.

7. The digestive power of the pancreatic juice over albumenoid matter is lost after extirpation of the spleen, but its other digestive properties remain.

8. After removal of the spleen the material destined to form pancreato-pepsine accumulates chiefly in the pancreas, and may there be also changed into pancreato-pepsine under the influence of those chemical changes which accompany the commencement of putrefaction after death.

9. After division of its nerves the spleen remains flaccid and then wastes, as is generally the case with erectile tissues when their vaso-motor nerves are paralysed. (*Medical Examiner,* July 26, 1877.)

**The Cause of Sleep.**—M. Preyer, in a Memoir read before the International Medical Congress, gave the following as the result of his observations and experiments on the cause of sleep:—

1. The researches which he has made on this subject lead to the following conclusions. Natural, periodical sleep is a condition totally different from pathological or artificial conditions resembling it, such as somnolence, coma, asphyxia, and narcosis.

2. Natural sleep has often been confounded with these states. The chief difference will be found in the circumstances that natural sleep is always preceded by some fatigue of muscles, organs of sense, or brain.

3. No mental phenomenon can manifest itself unless the brain be supplied with a certain amount of oxygen. The latter is carried to the brain by the blood-vessels. Whenever the ganglionic brain-cells receive a diminished quantity of blood cerebral action is suspended as it is during sleep.

4. Now, as the brain of a sleeping animal receives as much blood as it does when the animal is awake, we are compelled to

infer that the influences of oxygen on the waking and the sleeping brain are different.

5. During an active condition of mind or body certain substances are brought into existence which are not found (or, at all events, very sparingly) during a state of rest—lactic acid, for example, and creatine. These latter substances may accumulate in the blood, and as they have a great affinity for oxygen they appropriate a principle required for active exertion. The first stage of this accumulation characterises fatigue; the second stage gives rise to sleep; the third stage, when oxidation has been completed, is followed by awakening.

6. In a word, the products of muscular work, especially lactic acid, when artificially introduced into the system, are capable of inducing a sense of fatigue, and even sleep, when all external causes of excitement are removed.

7. It may, and often does, happen that the artificial introduction of lactic acid or the lactates is not followed by the effects just mentioned. Such cases require a careful study of various influences before they can be explained; but he maintains that they do not shake, much less overthrow, the foundation of his theory. (*Medical Examiner*, July 26, 1877.)

**The Mechanical Treatment of Rheumatic Fever.**—Dr. Franz Riegel, in a recent paper published in the *Archiv f. klinische Medicine* (p. 563), advocates a method of treatment of acute rheumatism, from which internal remedies are entirely excluded, namely, the fixation of the rheumatic joints by means of splints, as was originally recommended by Seutin. Dr. Riegel's experience is founded on forty-one cases of acute rheumatism with multiple joint affection treated in the hospital at Cologne. It should be specially remarked that the splints were only applied, as a rule, to those joints which were most swollen and most painful; the other joints were either simply wrapped in cotton wool, or had some narcotic liniment applied to them. No medicine was given internally. The apparatus used consisted of pasteboard splints thickly lined with cotton-wool, and attached in the ordinary way by means of straps or bandages. Each joint had two pasteboard splints applied to it; those for the knee, for example, being thirty-six centimetres long, and about sixteen centimetres broad, with a piece cut out in the middle of both, so as to adapt them better to the form of the joint, the knee being kept in an extended position. Before application the pasteboard was always wetted, to make it fit better. Dr. Riegel lays the greatest stress on the lining of the splints with wadding, for the latter must always be used in *very thick layers,* so as to render the pressure as even as possible over the whole joint. As it was found very difficult to apply splints to the hip and shoulder joints, they were only thickly covered with wadding, and fixed as far as possible with bandages. The results of this treatment were briefly, as follows :—1. The application of the splints immediately relieved even pains which were previously most agonising; and,as a rule, in all cases immediate relief was felt, and continued as long as the joint was bandaged. 2. It was found that the bandage must be allowed to remain on the joint, provided it is properly adapted, for several days after all pain has completely ceased; and, if possible, it should stay on until the patient's general state, as well as his temperature, have become normal. It is better to let it stay on too long than too short a time. Quite exceptionally Dr. Riegel has allowed it to remain fourteen days; on the average it remained six to seven days. 3. The effect of this treatment on the temperature was less favourable than on the pain; in scarcely any case in which the thermometer was used throughout the whole course of the disease (as it was in some cases every two hours, day and night) was a marked fall of the temperature observed as an immediate consequence of the application of the splints; but, as a rule, unless there were complications or sudden relapses, the temperature gradually fell from the moment the apparatus was applied, and continued to do so until it became completely normal. 4. The fixation of the joints appeared to have no influence in preventing or modifying cardiac complications. In several cases the latter supervened while the joints were fixed, and after all pain had ceased. 5. The diminution of perspiration was not specially remarkable, though it seemed occasionally that the treatment exerted some slight influence over it. (*Medical Times and Gazette,* No. 1396, 1877.)

**Treatment of Catarrhal Jaundice.**—Dr. Krull of Güstrow, recommends enemata of cold water as an excellent remedy in catarrhal jaundice. One to two litres of water at a temperature of 59° Fahr., which may gradually be increased to 72° Fahr., are to be slowly injected into the rectum by means of an irrigator once a day. The patient is to retain the water as long as possible. The first effect of this treatment is the rapid disappearance of oppression in the epigastrium, as well as of nausea and headache; the appetite also quickly returns. In half of the cases thus treated (eleven in all), the fœces were tinged with bile after the second injection, and in the cases of longest duration, in one of which the disease had existed for more than a year, their normal colour returned not later than the fourth day. The largest number of injections used in any one case was seven. Most of the patients had previously been treated unsuccessfully by the ordinary methods. Dr. Krull explains his results on the supposition that the cold water not only increases peristaltic action of the bowels, but also excites sufficient contraction of the bile ducts to enable them to overcome the obstacle due to catarrhal swelling or inspissated mucus at the entrance to the duodenum. (*Med. Times and Gazette*, No. 1396, 1877.)

**Treatment of Chronic Ulcers of the Leg.**—Dr. W. Alexander, Surgeon to the Liverpool Workhouse Hospital, in a communication to the *Medical Examiner*, gives the results of some experimental researches he has had the opportunity of making on the relative value of the application of different ointments and lotions to chronic ulcers of the leg. The only unctuous application in which he has any confidence is the boracic acid ointment, made after Mr. Lister's formula, of one part of boracic acid, one part white wax, two parts paraffin, and two parts almond oil, modified and softened by a little glycerine. This is most useful, he finds, in slowly healing ulcers, keeping them clean and healthy looking for any length of time. Chloral lotion has two distinct properties, cleansing and healing, the former being its pre-eminent one. He regards it as the most generally useful lotion. In a healthy sore, where there is no mechanical obstruction to cicatrisation, the lotion most rapid in producing the desired effect is chloride of zinc. The sulphate appears to be much inferior. Much caution is required in the use of both. The lotio borosalicylica is very useful in superficial ulcers. The old spirit lotion still holds its ground as a most useful application to healthy wounds, and lotio ferri is highly advantageous in pale anæmic ulcers with watery discharge. Lead and opium lotion holds an enviable position in clean but irritable ulcers, with a deep-red and painful state of the integument around. This seems to be its special niche, as it nearly always leads to disappointment when used in other varieties of ulcer. Water-dressing, he thinks, may do well in private practice, but is dangerous where many ulcers are congregated, and he only tried it in two cases. Carbolic acid, used either as a lotion or mixed with oil, he looks upon as our sheet anchor in hospital practice, and especially in workhouse hospitals. It should be resorted to at once if pyæmia, erysipelas, or phagedæna threaten, and in dirty sores of all description, but its efficacy in healing chronic ulcers is much inferior to many other applications. Mr. Hutchinson's antiphlogistic lotion, composed of acetate of lead ʒiv., diluted acetic acid ʒii. ℈ii., and rectified spirit ℥viii., healed five out of eleven cases. Electrolysis and grafting he classes together as different modes of forcing cicatrisation in healthy granulating surfaces. When everything is favourable cicatrisation may be much hastened and facilitated thereby, but in chronic ulcers electrolysis resembles the application of the spur to the exhausted horse, and grafting is to the ulcer what over-feeding is to an exhausted stomach. He dwells on the great advantages to be derived from mechanical appliances in the treatment of ulcers, and mentions the several situations where mechanical forces prevent cicatrisation. In conclusion, he believes he is justified in laying down the following propositions regarding chronic ulcers of the leg:—(1) That an ulcer on a comparatively healthy leg will be healed by every mode of treatment that secures cleanliness, and that does not interfere with the healing process. (2) That in the majority of cases the causes preventing cicatrisation are mechanical, and can be best treated by removing or counteracting these obstacles, and that until this is done any benefit to be derived from topical applications will be but temporary and evanescent. (3) That large ulcers of the leg require a certain time to cicatrise, that periods of rest in the process are necessary for the maturing and contraction of each fresh piece of a cicatrix, and that we ought to devote more attention to the signs that will indicate whether an indolent ulcer should be stimulated, or whether the apparent indolence is only a rest, as necessary for its future exertions as our daily sleep is to us. (4) That we must shun the over use of wet applications, the lotion should be applied to the ulcer alone, and the surrounding skin should be kept as dry as possible. (5) That where wet applications are resented by the skin or ulcer, oxide of zinc powder dredged over the limb is most useful; and where the ulcer is healing, but the surrounding skin unstable, the zinc lotion to the ulcer and the powder to the skin have seemed to me the most appropriate treatment. (*Med. Examiner*, vol. ii., No. 19.)

## Extracts from British and Foreign Journals.

**Ætiology of Cancer.**—The following are the conclusions arrived at by M. G. Salle in a work just published on the Ætiology of Cancer:—1. Cancer is a disease occurring at all ages; but its maximum of frequency is from forty-five to fifty-five years. 2. It is more frequent in women than in men, a circumstance that is in great part due to the great development and functional activity of the generative organs. 3. Pregnancy seems to retard the progress of cancer, which, however, is exasperated by frequent accouchements. 4. The mortality from cancer varies from six to eight of the general mortality. 5. The stomach, uterus, liver, and mammæ are in decreasing order the organs most frequently attacked. 6. Celibacy and sterility have no more influence than fecundity on the development of cancer of the uterus. 7. No constitution protects from cancer. 8. Heredity exerts an indubitable influence. The predisposition and not the diathesis is inherited. The number of generations affected seems to exalt this hereditary predisposition. It may leap over one generation. 9. Cancer is more frequent in towns than in the country, and in the wealthier than in the poorer classes. 10. Depressing mental conditions appear to possess a real ætiological importance. 11. Venereal excesses are without influence. 12. Insufficient alimentation, by diminishing the resistance of the organism, favours the development of the disease. 13. Chimney-sweeps, stokers, and the workers in paraffine are liable to cancer of the scrotum. 14. Slight but prolonged traumatisms and local irritation are certain causes of cancer, but their mode of action is unknown. 15. Cancer is more frequent in temperate than in tropical regions. It is most observable in those nations whose civilisation is most advanced. 16. Winter is the most unfavourable season for the cancerous patient. 17. The contagion of cancer is quite credible, but has not been demonstrated; it is not, however, easily accomplished, and the conditions requisite for its occurrence are still unknown. 18. Cancer, though not yet known to be certainly inoculable, is probably so by means of grafts. 19. There is an undoubted connection between herpetism and cancer; chronic affections only act by debilitating the whole system. 20. Cancer distinct in its origin does not proceed from the degeneration of other forms of tumour. 21. The possibility of the co-existence of cancer with tubercle is undeniable. 22. Perhaps even some causal relation may exist between the two diseases. (*La Province Médicale,* June 27, 1877.)

**Treatment of Irreducible Hernia.**— Dr. Phillipe (St. Maudé) recommends the employment of subcutaneous injections of hydrochlorate of morphia in the treatment of cases of irreducible hernia, believing that it renders less dangerous one of the most difficult operations in surgery; that it combats the spasm of the muscular and fibrous tissues with more certainty and rapidity than antiphlogistics, antispasmodics, and anæsthetics, including chloroform, with its period of excitation, which is always to be feared; and, lastly, that it completely removes pain. (*Ibid.*, June 27, 1877.)

**Besnier on a Simple Means of Lessening the Pain attending Blisters.**—The practice of blistering in the treatment of acute articular rheumatism would meet with much more favour in this country if pain and, in certain cases, stranguary and slight hæmaturia were not inherent to this mode of treatment. A hypodermic injection of morphia relieves the pain, but has no effect upon the urinary troubles. To alleviate the one and prevent the other, M. Ernest Besnier proposes the following plan:—Take care that the blister is applied in the early morning: those convenient ones which are covered with a sheet of oiled tissue-paper will cause very little suffering, and never give rise to those vesicatory or renal troubles which are now and then so severe and painful, provided the blister be removed after a few hours (five to ten at the outside), as soon as the epidermis begins to rise slightly and partly, which we may recognise by the skin becoming pearly and irritated. The plaster must then be removed (a very few hours' application is sufficient for a child or a thin-skinned person), and its place must be supplied by a piece of blotting-paper very thickly coated with cerate or cold cream. The vesication continues almost painlessly and the blisters rise nearly as well as if the cantharides had been kept applied. The practitioner who does not disdain to attend to such minute details will gain the thanks of his patient, and more especially of those who have been previously treated by such inhuman proceedings as are common where blistering is employed. (*The London Med. Record*, Feb. 15, 1877.)

**Treatment of Rheumatism with Salicylic Acid and Salicin.**—Dr. Brown, of Boston, gives an interesting analysis of

109 cases of rheumatism that have lately been under treatment at the Boston City Hospital, in all of which either salicylic acid or salicin was administered. Of these 59 were males and 50 females. In 38 of the 63 cases observed, which were treated with salicylic acid, the heart was normal throughout; in 24 the heart was affected on entrance. In two of these the cardiac symptoms disappeared while in hospital. In three cases the heart became affected after entrance. Thus, upon the basis of 63 cases, the heart became affected in only 4·76 per cent., while under the alkaline treatment, in the series of cases reported by Dr. J. G. Blake, $13\frac{22}{31}$ per cent. developed heart affection after entrance. The average time elapsing before distinct amelioration of the symptoms occurred was 1·46 days, varying from three hours to four days. The average time to complete cessation of pain was 2·85 days, varying from twelve hours to fifteen days. The average amount of acid taken to produce relief was 154 grains; the quantity varied from 30 to 210 grains. The amount required to produce complete relief from pain and mobility of the joints was 531·22 grains to each patient; to each attack 343·73 grains. The largest amount taken was 2,250 grains. The average time during which the acid was taken by each patient was 6·22 days, varying from one to thirty-one days. The average number of days each patient was in the hospital was eighteen, varying from three to fifty-nine days. Two cases died, one from pericarditis and one from cerebral complications. Nausea and vomiting were noted in 20 cases; headache was noted in 6, ringing in the ears in 19, and deafness in 10 cases; numbness and prickling sensations were observed in three cases in the affected parts, and in one case extended all over the body. Delirium occurred in 3 cases and pneumonia in 3 cases. The constant effect of the administration of the acid, when given in full doses in acute cases, was to cause a fall of temperature, but never below the normal. The effect on the pulse and respiration was less marked, as they usually fell less rapidly. The pulse-rate often increased for a time in weak or debilitated subjects. Experience shows that the acid is much better adapted to acute than to other varieties of rheumatism. Many cases were left in a poor general condition after treatment, with more or less complete loss of appetite; to recover from this state often required more time than to produce a cure of the rheumatic symptoms. The acid was found to be best given in pills made with honey. The experiments made with salicin show that it acts more slowly than the acid, but that the patients were not left in the poor condition above alluded to. Dr. Brown thinks that on this account the employment of salicin is worth a more extended trial. (*Boston Med. and Surg. Journal*, 1877.)

**Case of Infraorbital Neuralgia Cured by Operation.**—M. Tillaud reported the case, at the last meeting of the Société de Chirurgie, of a woman, thirty-one years of age, who had for ten years suffered from disease of the left maxillary sinus leading to neuralgia of the infraorbital nerve. She had been subject to much treatment for eleven years, and injections of tincture of iodine and of the liquor of villatte and cauterisation with the actual cautery had been successively and ineffectually tried. The sinus had been extensively opened. M. Magitot had seen and prescribed for the patient, but his treatment had failed. Having satisfied himself that the pain was really seated and constant at the plane of the infraorbital foramen, M. Tillaud decided to resect the nerve as far from the surface as possible without going quite so far back as the pterygo-maxillary fossa, because the posterior dental nerves were absolutely unaffected. A large horizontal incision was made in the fold of the eyelid, and from this another descended vertically; the infraorbital nerve was immediately exposed and a ligature was passed round it at its point of issue. The two flaps were dissected back, and the branches followed out with great care. Then, having detached the periosteum of the orbit, the globe of the eye was raised by means of a retractor improvised from a coffeespoon. A small ethmoidal artery which bled was stopped by torsion, and the transparency of the parts allowed the nerve to be seen in its channel. It was separated by slight blows of a mallet, and having been drawn out by means of the thread already attached to it, it was cut as far back as possible and turned downwards. He then broke down (*défoncai*) the canine fossa and explored the maxillary sinus, in which he found two osteophytes and the mucous membrane thickened and brawny. Eleven days after the patient was perfectly and radically cured. The nerve examined by M. Ramier only appeared to be hypertrophied. (*La Province Médicale*, June 20, 1877.)

**Abortive Treatment of Whooping-Cough.**—Dr. Sawarowsky directs the patient to breathe several times a day a mixture of a few drops of nitrite of amyl in a drachm of chloroform, and at the same time administers internally for three days every two hours one-twelfth of a grain of silver cyanate and three grains of pure clay. Hot food and drinks must be avoided. A cure is effected in a few days. Dr. Lasinsky treats his patients by insufflations of a powder composed of fifteen grains of hydrochlorate of quinine, thirty grains of salicylic acid, and seven grains each of bicarbonate of soda and white sugar. A small quantity of this powder is blown into the larynx twice a day. He states that in the course of eight days the attacks become greatly reduced in violence and frequency, and that in twenty-five cases thus treated the whooping was stopped in the course of from eight to twenty-five days. (*Medicinische-chirurgische Rundschau,* March, 1877.)

**Treatment of Constipation.**—In a clinical lecture delivered at the Bellevue Hospital, New York, Dr. W. H. Thomson divides cases of constipation into those due to deficient action of the small and those due to deficient action of the large intestine. The deficient action may in either case be of the secretions or of the nervo-muscular apparatus. Deficient secretion in the *small intestine* may be caused by some disturbance of the liver, and frequently follows an attack of tropical diarrhœa, such as is seen in the Southern States, or as a consequence of malarial poisoning in the Northern States. The symptoms are negative, except that there is headache. There is no large amount of fæcal accumulation; the motions if obtained by medicine are moderate in quantity and quite dry. Neither mild nor strong cathartics are here of service, but Dr. Thomson has found the best results follow when the patient is directed to take on rising in the morning one or two tumblerfuls of drinking water; a little sulphate of magnesia may moreover be added with advantage. He notes that the addition of small doses of quinine to salines increases their power of acting upon the intestines. Thus one grain of quinine with one drachm of sulphate of magnesia in a tumbler of water will commonly act well in all forms of deficient secretion from the bowels, especially if continued for some weeks. Fruits, as oranges, figs, and apples, are doubtful, though popular remedies, and may do more harm than good. Considerable quantities of water should be taken with them. Where there is flatulence resulting from decomposition of the intestinal secretion, recourse may be had to the following pill:—Assafœtida gr. iv, saponis gr. ix, to which nux vomica may be added if there be deficient innervation of the intestine. Deficient innervation of the intestine is usually associated with the constipation that troubles persons of sedentary habits of life, as tailors, and elderly persons generally. Such patients should be sent away from home to a mineral spring, and a cold sitz-bath taken every night in water as cold as the patient can bear, providing there is good reaction afterwards; or the belly and spine may be sponged or douched with cold salt water. In this class of cases nux vomica is a very efficient remedy, as is also the application of the Faradaic current, one pole being placed on the spine and the other moved up and down the abdominal wall. Constipation dependent on the *large intestine* is usually due to deficient innervation. There is large accumulation of fæces in the large intestine, and especially in the rectum. Hæmorrhoids, prolapse of the rectum, and even rectal abscess are apt to occur.

Enemata may be used in the first instance to remove the contents, but should never be continued as regular treatment. Strychnia will then be found an extremely valuable remedy locally applied. The manner in which long standing cases of prolapse of the rectum can be cured by the injection of strychnia beneath the mucous membrane is wonderful. The same treatment can be adopted in cases of constipation dependent on enlarged prostate. In other cases where there is a tendency to the formation of scybalous masses in the large intestine from deficient secretion, stramonium and belladonna are of service, the latter given in quantity sufficient to cause some dryness in the mouth in the morning; Faradization may also be used. (*New York Medical Record*, May 5, 1877.)

**Treatment of Chronic Pharyngeal Catarrh.**—Riesenfeld, adopting the recommendation of Michel, has tried the effects of galvano-cautery in fifty cases of chronic pharyngeal catarrh, in none of which was there any follicular enlargement, and he is well satisfied with the result. He employed a Middeldorpf's battery and a knife-shaped cautery, with which he made a series of strokes over the uvula and tonsils, varying in number with the severity of the case. The patients bore the operation exceedingly well; the only inconvenience is the smell of the burnt membrane; care must be taken not to burn the sides of the tongue with the conducting wires. After the operation, which sometimes occasions a little difficulty in swallowing, the patient is directed to gargle the throat frequently with cold water for two days, and to take only fluid nourishment. The eschar becomes detached in the course of four or five days, and suppuration, if any be present, never lasts longer than eight days. In slight cases one cauterisation is sufficient, and he has never found it requisite to repeat the process more than five times. (*Centralblatt f. d. med. Wiss.*, June 23, 1877.)

**Ætiology of Hay Fever.**—G. F. Patton, in order to test the statement commonly made that hay fever depends on the action of the pollen grains of the plants blossoming in the early part of summer, took occasion to apply the pollen of *Festuca pratensis*, *Dactylis glomerosa*, and *Secale cereale* to the Schneiderian mucous membrane, to the conjunctiva, and to the surface of slight scarifications of the skin, without, however, producing any other effect than a little irritation. For the treatment of the disease he recommends instead of the application of quinine, which is too irritating in most instances, a weak solution (1 : 500) of salicylic acid with the addition of three parts of common salt. (*Virchow's Archiv*, B. lxix. p. 410.)

**The Action of Cicuta Virosa and some other Poisonous Plants.**—The most poisonous part of the plant, according to

Trojanowski, is the root. The æthereal oil contained in this has no poisonous action, but the activity appears to reside in certain bright yellow drops contained in the resinous cortical zone, and from this a homogeneous, tenacious, non-drying amorphous highly-poisonous resinous material can be obtained. Two or three milligrammes are sufficient to poison a frog, and a cat is killed by the intravenous injection of ·007 of a gramme. It is proposed to name it "Cicutoxin." It is absorbed slowly, the symptoms only appearing after twenty minutes, and sometimes not till after the lapse of several hours. The mode in which it gains entrance into the blood when ingested is not clear, since it is insoluble in water. In medico-legal cases, where no part of the structural elements of the plant can be discovered, it may still be possible to obtain sufficient of the resin by macerating the stomach in ether to make a physiological experiment on a frog. The actions of Cicutoxin are remarkably similar to those of Picrotoxin (from the *Anamirta cocculus*), of Coriamyrtin (from *Coriaria myrtifolia*), of the resin of digitalis and taxus, and those of the baryta salts. These collectively form the so-called "group of convulsive poisons." They act as violent excitants of a limited region of the medulla oblongata near the apex of the calamus scriptorius; of the convulsive centre discovered by Heubel in the frog, the existence of which has also been demonstrated by Nothnagel in mammals, and also to some extent to all the other centres situated in the medulla oblongata. The general symptoms produced by these poisons are well shown by the injection of a small quantity of cicutoxin beneath the skin of a frog. After twenty minutes the hindlegs become stiff, the thighs are thrust out at right angles to the body, and the toes separated. The respiratory movements are much accelerated (irritation of the vagus centre), and owing to the inspiratory acts preponderating over the respiratory, the abdomen is blown up; whilst in consequence of the convulsive contraction of the abdominal muscles the air is forcibly driven through the contracted glottis with a very characteristic shriek. Tonic-clonic contractions of the muscles generally now supervene, the respiration is arrested, the movements of the heart are retarded, and death occurs with general paralysis after some hours or days. In mammals after a period of restlessness of variable duration and abundant flow of saliva, the respiratory movements become more rapid and deep, and soon the most violent tonic and clonic convulsions of the voluntary muscles set in, during which the respiration is stopped by tetanus of the diaphragm, the cardiac beats are rendered much more energetic, and in the height of the attack are, with the circulation, brought to a standstill. The urine and fæces are expelled with convulsive violence. The attacks occur with increased frequency, and the animal dies exhausted from inadequate respiration. During the whole period the reflex excitability is enormously increased. Dr. Planat has suggested the employment of picrotoxin in the treatment of epilepsy. He commences with small doses and gradually increases them. In twenty-two cases thus treated more or less complete cures were effected. (*Der praktische Arzt*, June, 1877.)

**Treatment of Syphilis.**—K. V. Mosengeil finds the duration of syphilis much less with out-of-door treatment than in hospital, and this he ascribes to the much greater metamorphosis of tissue that takes place from better diet, more drink, and more exercise. He treats his patients by rubbing in fifteen grains of ung. hyd. per diem, and subsequently iodide of potassium ointment; keeps the patient from twenty minutes to one hour in a warm bath, making him at the same time drink hot tea. If the patient have an appetite, he is allowed to eat steaks, eggs, sausages, and to take some wine and beer. He is now wrapped up and made to sweat for several hours, when a cold douche is applied and infrication practised. The patient is then allowed to pursue his avocation; is shampooed and permitted to dine. Iodide of mercury is prescribed in small quantities for a few days, and if any glandular enlargements occur they are removed by friction. He finds that relapses rarely occur. (*Deutsche Zeitschrift f. prakt. Med.*, Nos. 11 and 12, 1877.)

**Treatment of Constipation Associated with Chlorosis.**—The treatment pursued in the Bellevue Hospital when constipation is associated with chlorosis is based on the view that it is of nervous origin, is due in part to paralysis of the intestines, and in part to spasmodic constriction of the intestinal tube; with this there is either deficiency, total suspension, or perversion of the secretions of the alimentary canal and connected glands. Hence the first proceeding practised is to operate on the peripheral extremities of the nerves involved by means of external applications. It is a well-known fact that when the feet and hands are plunged into water contraction of the ovarian plexus of nerves is produced, hence a natural method for bringing about increased flow of blood to the uterus is to stimulate the peripheric nerves by applying dry heat to the feet and hands. In addition wrapping the feet and arms in clothes wet with a solution of capsicum, and applying the same over the abdomen, is found of great assistance in overcoming constipation. Cathartics should not be resorted to until the measures just mentioned have been employed for some time. Of cathartics, aloes and rhubarb are the most serviceable. Iron should never be relied upon unless combined with these two remedies, and the best results are obtained by combining sulphate of iron with carbonate of potash and nux vomica, as in the following prescription :—Potassæ bicarb. ʒss to ℈ii, ferri sulph. gr. x, ext. nucis vomicæ gr. x. M. et divide in pil. No. xx. One to be taken after each meal. In addition it is considered advisable to have a pill which can be administered subsequently whenever the bowels become confined, and which may restore innervation and rhythm to the muscular coat of the intestine. Two agents can be so employed, nux vomica and belladonna, and if these are combined with small doses of a real laxative or cathartic, comparatively small doses will produce free catharsis. Electricity is regarded as a valuable agent in the treatment of chlorosis, simply because it acts as a stimulant to the circulation, like dry heat. It is desirable to apply it to parts associated with the uterine circulation, and this can be conveniently done by placing one pole of the battery upon the soles of the feet and the other over the sacrum. The proper time for such application is immediately after breakfast, because the electricity also acts upon the intestines, and this being the normal time for an evacuation from the bowels, it may materially assist in overcoming the constipation. (*The New York Medical Record,* March 17, 1877.)

**Treatment of Spina Bifida.**—Dr. Morton of Glasgow gives the following rules as important in the treatment of spina bifida by a new method. (1) The child should be in a thriving condition; (2) make a tentative puncture with a grooved needle; (3) draw off not more than half of the fluid contents; (4) carefully close the puncture, by collodion or otherwise, so as to prevent further escape of fluid; (5) when proceeding to inject use a trochar with canula of a medium size, not too small, otherwise the glycerine solution will not run readily through the canula; (6) the parts must be carefully handled and protected by the nurse, and the injection repeated if required. The formula for Dr. Morton's glycerine solution is :—

℞ Iodi gr. x,
Potassii iodidi gr. xxx,
Glycerini ℥i. M.

From half a drachm to two drachms of this solution is to be injected according to the size of the tumour. In puncturing the cyst, Dr. Morton prefers a point at the upper part, and a little to one side of the middle line. (*Edinburgh Medical Journal,* July, 1877.)

**The Feet of Catarrhal Patients.**—Dr. Thomas Rumbold points out that cold feet predispose to colds in the throat, ears, and head, and that cold and wet feet are amongst the most certain causes of congestion of the respiratory mucous tract.

Wearing woollen stockings induces perspiration of the feet; they are then liable to become cold; should this be the case, a thin pair of cotton stockings should be worn under the woollen stockings. A good remedy for cold and damp feet, is to bathe them at bedtime; the patient wrapping himself in a blanket, and adding a little hot water to the bath from time to time for about a quarter of an hour. The feet should then be dried by being well rubbed with a coarse towel, and should afterwards be anointed with vasaline, which he considers to be far superior to any of the oils or cerates in common use. If there be fœtor from the feet, salicylic acid and bromide of potassium, of each five grains to one ounce of vasaline, will, in a few bathings and anointings, correct the condition. Women, too, frequently fasten up their stockings by elastic garters, a proceeding apt to produce cold feet by impeding the circulation. He recommends that the stockings should be kept up by tapes sewn on to the drawers and stockings on each side. Boots that are thin or tight and shoes that are low in the ankles should be avoided in cold or damp weather. One of the ways in which a cold is mysteriously contracted is to exchange a pair of warm boots for a pair of low slippers. Those who do this forget that their feet and ankles have been protected all day, and that they have not only uncovered them but placed them in the coldest stratum of the air in the room. The precaution that should be taken is to draw over the ordinary stockings or socks a pair of woollen ones. (*Virginia Medical Monthly*, vol. iv., No. 4, July, 1877.)

**A New Method of Curing Popliteal Aneurism by Pressure.**—Dr. Martin Burke gives several cases in which an easy and perfect cure of popliteal aneurism was effected by the following adaptation of a method he had formerly seen noticed in an American publication, and which essentially consists of the employment of a conical shot-bag suspended by a weight from a rope, the apex of the cone being allowed to press upon the femoral artery in Scarpa's space. The shot-bag should be made of canvas, in the form of a flattened cone, and its apex should measure about one inch in diameter. Either a rounded piece of cork or of india-rubber, one inch in thickness, should be fitted accurately to the inside of the apex of the cone. A long thin rod, reaching down to and resting upon the rubber in the bag, should be inserted, and held directly in the middle of the cone, while shot is being poured around it, and until the requisite weight is attained, say about twelve pounds. A piece of canvas of the requisite size, with a hole cut in its centre for the passage of the rod, is now tightly stitched over the base of the bag. A stout wire hook being now fastened securely both to the centre of the broad base of the cone, and to the rod as it emerges from that point, to prevent it from slipping from its bed, and tapes having been sewed to the conical point of the bag, it is ready for use. And now to suspend it: a small pulley is driven into the ceiling, through which is passed a rope, both ends of which are to be attached to the wire hook in the shot-bag, with this difference, that one end is passed through rings fastened to the rod, and helps in a measure to keep it in place. To the free extremity of the outer end of the rope the rubber tubing is secured, and from a hook in its free end a large linked chain connects it with the hook in the centre of the base of the shot-bag. (*New York Medical Journal*, June, 1877.)

**The Abuse and Use of Bromides.**—Dr. E. C. Seguin, in a paper read before the New York Medical Journal Association, discussed this subject under two heads:—1. Bromism, or intoxication by the bromides; and 2, A statement of his own method of using the bromine salts in the treatment of epilepsy and other neuroses. The results of recent inquiries show that the physiological result of the action of the bromides is lessened irritability of the nervous centres, especially of the motor tract, and this is believed by some to be owing to the action of the drug in causing contraction of the arterioles and consequent diminution in the amount of blood in the nervous centres, whilst others think the bromides affect the nervous tissues directly. Dr. Seguin holds that they act mainly on the anatomical elements and chiefly on the ganglion cells of the nervous system, and he thinks that their use is often abused; cases of impaired nutrition and atomy being not infrequent. The effects of their abuse are seen in the occurrence of general debility, with weak pulse and cold extremities, tendency to stupor, slight difficulty in speaking, the bromic breath, and acne. Some suffer from nervousness and inability to sleep. In other and more severe forms of bromism conditions similar to those of the general paralysis of the insane may be established, though the diagnosis is in general not difficult to make out. In regard to Mr. Seguin's method of administering the bromine salts, he stated:—1. That the prolonged use of the bromides is contra-indicated by congenital feebleness. 2. That the bromides are well borne by persons of fairly full habit and good nervous power. 3. That the bromides are indicated in cases of abnormally great irritability of the nervous system in its motor (muscular and vasomotor) and ideational tracts. 4. That the contra-indications above-named are much less to be regarded in the management of that formidable neurosis epilepsy. 5. That epilepsy is the only disease which justifies the deliberate production of a degree of bromism for its cure. Dr. Seguin's method of prescribing the bromides in the treatment of a case of idiopathic epilepsy is the following. Two solutions are employed:—Potass. bromid. ℥j, ammon. bromid. ℥ss, aquæ ℥vii, and sodii bromidi ℥j, ammon. bromidi ℥ss, aquæ ℥vii. Each solution to be given by the teaspoonful in a tumblerful of water, the largest dose being given in the evening till slight bromism is produced, and this should be maintained for some months. The use of the bromide should be continued at least for three years after the last attack. If acne supervene it should be treated with the occasional use of arsenic, sulphur ointment, mercurial plaster, and alkaline lotions. General debility or slight paresis must be treated with strychnia, nux vomica, oxide of zinc and quinine. The dizziness can be relieved by the inhalation of nitrite of amyl, by stimulants, and by quinine. The patient's diet and hygiene must be regulated, and cream, cod-liver oil, iron, quinine, phosphorus, strychnia, with nitro-muriatic acid, wine, beer, or whisky prescribed as may be required. In certain cases such medicines as acted more directly upon the morbid state of the nervous centres may be associated with the bromides, the more important amongst which is belladonna. (*The New York Medical Record,* May 5, 1877.)

**Preventive Treatment of Epileptic Attacks.**—E. Vallender states that in those cases of epilepsy in which the attack is preceded for some minutes by an aura, it may be warded off by the subcutaneous injection of a solution of apomorphia. The quantity injected should be one-quarter of a Pravaz-syringeful of a solution containing one-sixth of a grain in two drachms and a half of water. The attack is found to be wholly prevented, or is considerably diminished in intensity and shortened in duration. In one case by the steady employment of this means the attacks, which had previously been very violent, were altogether arrested and a cure effected. (*Berlin. klin. Wochenschrift,* No. 14, 1877.)

**Treatment of Anthrax.**—M. E. Comin, as soon as the progressive form of the inflammation is established in any case of anthrax, applies at a distance of about an inch from the centre of the carbuncle a broad ring of Vienna paste, and removes the gangrenous parts from the interior of this ring as they separate off with scissors. The effect is sudden arrest of the extension of the disease and subsidence of the inflammatory swelling. The ring of Vienna paste should be from one-half to one inch broad. (*Gazette des Hôpitaux,* No. 17, 1877.)

**Poisoning by Bromide of Cadmium.**—Dr. G. A. Wheeler records a case in which a patient who was in the habit of taking bromide of ammonium for neuralgia took a dose made up for her by a chemist, and gave a little to her mother, who suffered from headache. She had no sooner swallowed it than she noticed the difference in the taste. Both she and her mother immediately began to vomit violently, and suffered from severe pain in the stomach, and the mother had diarrhœa. The nature of the poison being unknown, no antidote could be given. Milk, eggs, and oil were administered, and, when the prostration was at its height, brandy. After the vomiting had lasted for five hours the pulse becoming progressively weaker, the patients fell asleep, and complete recovery occurred after two days' confinement to bed. The bottle was labelled bromide of ammonium, but an analysis showed that it consisted of bromide of cadmium. This bottle was originally forwarded from Paris. Similar cases have been recorded as occurring in Germany. (*Boston Med. and Surg. Journal*, vol. ii., p. 434; and *Centralblatt*, No. 14, 1877.)

**Galvanisation of the Cervical Sympathetic Nerve for Exophthalmic Goitre.**—Dr. D'Ancona records the case of a woman of nineteen years, who had suffered for two years from exophthalmic goitre, with the usual symptoms. She had been subjected to various treatment, but without success, and had fallen into such a state of cachexia that her life was despaired of. Galvanisation by means of 10 elements of Stöhrer's battery was adopted, the current being applied for from 3 to 5 minutes for five months, during which time about 100 *séances* were held. Coincidently, Fowler's solution of arsenic, with anti-diarrhœic medicines, were administered. The improvement that resulted was very rapid and complete. She increased in weight 28lbs., and her cheeks became rosy. Both the exophthalmia and the enlargement of the thyroid gland disappeared. The pulse fell from 130 to 90. Menstruation, which had ceased, recommenced, and occurred regularly, and, in short, recovery was complete. (*Journal de Médicine*, Mai, 1877.)

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# Department of Public Health.

## WHAT HAS EUROPE TO FEAR IN THE FUTURE FROM ORIENTAL PLAGUE?

BY AUGUST HIRSCH.[1]

WHILE diplomacy was busily engaged in endeavouring to unravel the political "Eastern Question," a new "Eastern Question" of a hygienic nature arose, to wit, whether Europe was endangered by the recent reappearances of bubonic plague in the Levant. This question was first broached and discussed by the Society of Medical Officers of Health in England,[2] after the news of the various reappearances had gone the round of the ordinary newspapers, and excited no little attention both in medical and non-medical circles, while a feeling of painful astonishment affected the populations of Europe, to be thus again confronted with a frightful and almost forgotten spectre of a bygone time. It is not only right, but even imperative, that the import of this threatened danger should be ascertained, and the attention of Europe fixed upon the measures which might most readily obviate it.

Since the middle of last century Oriental plague had not had in Europe any practical importance as an epidemic disease. During the last ten years of the past and the first ten years of the present century, outbreaks of the malady in the Eastern and neighbouring States of the Continent, particularly in Russia, the southern parts of Austria, and in Greece, engaged the attention of administrative circles; but the general interest of Europe in the current century has been concentrated on one point only of the subject, namely, the system of quarantine and the perfecting thereof, as a means of arresting the diffusion of the pestilence. Thus it has happened that in countries least exposed to the danger, such as Germany, plague has become solely a subject of literary research, and has only an historical importance. Hence the disease has received but a passing attention from the medical profession and from the public, having been thrust into the background by the absorbing and present interest of other deadly sicknesses, such as cholera. It therefore needs no apology if I preface this article with a brief account of the early history and geographical distribution of plague.

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[1] Translated from the *Deutsche Vierteljährsschrift für öffentliche Gesundheitspflege*, 3 Heft, 1876.

[2] [Dr. Hirsch here refers, no doubt, to the discussion which took place in the Society, during its Session of 1874-5, on a paper communicated to it by Mr. Netten Radcliffe, "On the Prospect of a reappearance of Plague in Europe."—TRANSL.]

The first positive information which exists as to the appearance of plague dates from the third century before the Christian era, and indicates the endemic prevalence of the disease at that time in Egypt, in the eastern portion of the north coast of Africa and in Syria.[1] The first general spread of this disease from these countries, and especially from Egypt, so far as can now be ascertained, occurred in the middle of the sixth century after Christ, in the reign of the Emperor Justinian. According to the more trustworthy chroniclers of that century,[2] the plague spread itself in the year 542 A.D. from Lower Egypt, over Palestine, Syria, Persia, and Asia Minor, towards Europe, where, previously unknown, it declared itself in several places in the course of the next ten years, and before the close of the sixth century half of the inhabitants of the East Roman Empire were killed by the disease or by the general suffering caused by its ravages. Important data as to the devastations of this pestilence in Western and Northern Europe in the second half of the sixth century are furnished by the chroniclers.[1]

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[1] In the forty-fourth book of the *Collectanea Medicinalia*, of Oxibasius, found in the Library of the Vatican, and published by Cardinal Angelo Mai, is a quotation from a work of Alexander Rufus, respecting buboes, and which is to the following effect:—"The so-called pestilential buboe, the most dangerous and rapidly fatal form of the disease, springs up by preference in Lybia, Egypt, and Syria." The same work mentions also an epidemic of plague in Lybia, recorded by several Alexandrian physicians who lived at the end of the third or beginning of the second century before Christ. Alexander Rufus lived in the second century of the Christian era.

[2] See especially Procopius, Evagrius, and Agathias.

With this pandemic outbreak of plague in the sixth century began a long-continued prevalence of the disease in Europe, the northern coasts of Africa, and south-western Asia, which, as the following facts show, lasted over a thousand years.

Respecting the general spread of plague in Europe, even to the most distant spots of the Continent,[2] during the middle ages, important information is obtained from the chronicles of the period, in which the disease is described under the name of "Glades glandolaria," or "Morbus inguinarius." The current medical histories of the 14th and 15th centuries, moreover, give numerous and striking illustrations of the general and far-reaching diffusion of the sickness in Europe, and especially the numerous epidemiological writings of the celebrated physicians of the sixteenth century. Only a few years of the last-named century passed in which there were no signs of the spread of plague in one or other European country, and the lamentation of the Nuremburg Chronicler (Lange in Mencken Scrip. rer. german. ii. 88) was fully justified when he wrote:—"Et est stupenda res, quod hæc plaga nunquam totaliter cessat, sed omni anno regnat jam hic nunc alibi, de loco in locum, de provincia in provinciam migrando; et si recedit aliquamdiu, tamen post paucos annos circuitum revertitur et juventutem interim natam in ipso flore pro majore parte amputat."

In the second half of the 17th century a remarkable decrease in the prevalence of plague in Europe occurred, so much so that with the disappearance of the disease in 1660-1661 in Italy, in 1665 in England, 1661-1667 in Western Germany, 1667-1668 in Switzerland, 1667 in the Netherlands, and 1678-1681 in Spain, the epidemic seemed to have disappeared for ever in these countries. During the eighteenth century two great plague outbreaks alone occurred in Europe beyond the limits of the countries immediately contiguous to Turkey, namely, one in 1703–13, and the other in 1720—22. The first of these outbreaks (1703–13) spread from Turkey over Hungary, Russia, Poland, part of Austria, Bohemia, and Eastern Germany, extending westwards to the banks of the Elbe and northwards to the coast of the Baltic. The second great outbreak (1720-22) occurred in Provence. In addition to the above-mentioned great outbreaks in Central and Western Europe during the eighteenth century a slight outbreak occurred at Messina in 1743. In the nineteenth century four outbreaks occurred in the same divisions of the Continent, namely, in 1812 and 1815 in Malta, in 1815 also in the Apuleian coast town Noja, and in 1820 in Majorca. Plague had a much longer duration in Eastern Europe in the countries bordering upon Turkey (as in Turkey itself), to wit, Dalmatia, East Hungary, Transylvania, Wallachia, and South Russia. Considerable outbreaks of the disease occurred in these countries concurrently with the campaigns of 1770-72, 1812-15, and 1828-29. The last outbreak of plague on European soil beyond the frontier of Turkey took place at Odessa in 1837, and in the Greek island of Paros the same year. This last-named instance excepted, and a prevalence on the mainland during the war of 1825-29, Greece had not suffered from plague for two centuries.

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[1] For example, consult Gregory of Tours with respect to the prevalence of plague in A.D. 555 in Arles, Narbonne, Marseilles, and other towns of France; and Warnefried and Sigbert respecting the plague in A.D. 565 in different districts of Germany.

[2] Iceland, as is well known, suffered from plague in 1402 and 1493, carried thither in the first-named year from Norway, and in the second-named year from England, in which countries the disease was prevalent in the periods named.

The principal seat of plague in Europe during the eighteenth and nineteenth centuries was Turkey, and especially its capital city, Constantinople. Here, in the last-named century, the disease was more or less prevalent in 1800, 1803, 1808, 1812, 1814-15, 1828-29, 1834, 1836-7, and 1842. Since 1842 plague appears to have entirely disappeared from Turkey in Europe.

The area of diffusion of plague in Asia has been very much less than in Europe. On this continent its principal habitats have been the coast districts of Syria and Asia Minor. From these districts the disease has spread eastwards to the mountainous districts of the Lebanon and Armenia, and from Armenia it has extended on the one hand to Caucasia, and the other to Kurdistan, Mesopotamia, and Persia. The last epidemic of plague in Syria and Asia Minor took place in 1840-41, before which period the disease had been prevalent in the mountainous district of Erzeroum, and had been noticed in the Caucasus. In

Aleppo the plague showed itself at intervals of from fifteen to twenty years, and a like phenomenon was observed in Mesopotamia, the epidemic spreading into the latter country from Anatolia by way of Diarbekir and Mosul, and along the course of the Tigris to Bagdad, and of the Euphrates as low down as Basra. The earliest trustworthy account we have of plague in Mesopotamia dates from 1773. After this period plague was prevalent there in 1800-1801, and again in 1830-1834, an interval of thirty years occurring between each epidemic outbreak.

Respecting plague in Persia, Tholozan has recently made fresh researches.[1] He states that the disease has principally shown itself in the north-western districts of that country, particularly in Kurdistan and Azerbijan. Once only has it been observed in the northern provinces of Ghilan, Mazanderan, as also in the central province of Khorassan. Here also between the several outbreaks of the disease several years' interval took place. During the first sixty years of the present century plague prevailed in Persia once only in an epidemic form, namely, in 1830-1833.

With regard to plague in Arabia during the nineteeth century, the first record we have of the disease is in the year 1815, in which year it prevailed in a most deadly form, spreading from Yembo to Jeddah and Mecca. During the forty years following the disease appeared only once again in this country, namely in 1832, when it would seem that the malady was imported there from Persia.

The African plague-zone, which now comes under consideration, extended through the coast districts of Northern Africa from Egypt to Morocco. Here the principal seat of the sickness was in Egypt, but not Egypt generally, for the disease was restricted to the Nile valley in Lower and Middle Egypt, and has never been observed as high as Assouan (Upper Egypt). The disease, moreover, has never been observed in Nubia and Abyssinia. From 1800 to 1842 fifteen plague-years have been recorded in Egypt: 1800, 1804, 1812-1815, 1818, 1823, 1834-1836, 1838, 1840-1842. In 1843 plague disappeared from Egypt, and there has been no recurrence of the disease to the present time.

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[1] *Histoire de la peste bubonique en Perse.* Paris, 1874.

After Egypt, plague was most prevalent in North Africa, in Tripoli, Tunis, and Algiers. According to Barbrugger there have been twenty-six epidemics of plague in Tunis and Algiers from 1552 to 1784, intervals of several years having occurred between certain of the epidemics. The last epidemic prevalence of plague in these countries was in 1836-1837.

Morocco within a period of 150 years has been visited by plague in an epidemic form only four times. The last epidemic of plague there occurred in 1818, when the disease was generally diffused over Barbary.

The great drama enacted by plague for over a thousand years closes in the years 1840-1843. From the sixth century to 1843, very few years elapsed without some spot or other in the countries of the East, where the malady most prevailed, Egypt, Syria, Asia Minor, and Turkey, suffering from it in epidemic form. Since the year 1843, however, plague would seem to have disappeared from the earth, and more than two decenniums passed without a trace of the disease being observed in the East. But in 1858 a rumour spread of the reappearance of plague in the Tripolitan sea-port town of Bengazi. The official information as to this event was so vague and untrustworthy, that when the disease was reported to have disappeared in the following year, it is not to be wondered at that the existing belief in the entire disappearance of this dreadful malady was confirmed rather than otherwise. The occurrences of the last nine years have proved, however, that this was an illusion.

In 1867 another reappearance of plague was reported, respecting which it was, however, difficult at first to form a decided judgment. But before entering upon a description of this manifestation it will be well to refer to the question of the home of plague, concerning which the latest reappearances of the disease furnish additional information.

The question of the home of plague depends very much upon that of the contagiousness or transmissibility of the sickness. With the first general outbreak of the plague in the sixth century the question arose whether it spread from Egypt over Europe by means of contagion or from the existence of local conditions in the infected places similar to those which caused the disease in Egypt. In favour of the second alternative were considerations which even in these later times are argued not only with regard to plague, but also with regard to other infectious diseases, such as typhoid, cholera, and yellow fever, in which it has been shown that the arrival of a person sick of the disease, in a district previously free from it, is not necessarily followed by an outbreak of the malady. On the other hand, outbreaks of plague have occurred following upon persons coming from localities infected with the disease, the persons themselves remaining healthy; while, again, immediate and continuous contact with the sick often occurred without any transmission of the disease. Thus medical men and the attendants upon the sick did not suffer in greater proportion than people who did not come into contact with them. Frequently, certain quarters and even certain houses suffered from the disease, while adjoining quarters and houses would be wholly free from it. Finally, after prevailing a certain time thus confined to particular localities, the disease would decrease and disappear, within them. Notwithstanding these considerations, founded on observation, it was certain, however, that the plague usually spread from east to west, and that the epidemic always came from the East into Europe; and since the great epidemic of the 14th century, known as "the Black Death," the memory of which lives in history, poetry, and medicine, the opinion has been held that the disease was carried into Europe, and there propagated both by land and water.[1] Positive data as to the introduction of plague into Europe, and its spread there by individuals sick of the disease, and their personal effects coming from the East, were furnished by numerous and careful observations of thoughtful physicians during the 16th and 17th centuries. All doubt, however, of the Oriental origin of the plague must disappear before the experience of the scattered outbreaks of the disease which occurred in different parts of Western Europe during the 18th and 19th centuries. But the question remains:—Does the somewhat doubtful occurrence from time to time of plague in European Turkey furnish evidence that the disease has there sometimes an indigenous origin? The possibility of such an origin may, perhaps, be granted, but a liability to error of judgment exists here from the fact that cases of typhus may be seen in this country, even in the present day, complicated with buboes and simulating plague, but not identical therewith.

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[1] This "Black Death" appears to have been complicated by an acute pulmonary affection. An excellent description of the dissemination of this epidemic from the East to Europe is given by an eye-witness, an Italian lawyer, Gabriel de Mussis. (See von Henschel, Näser's *Archiv für die Ges. Med.* s. ii. h. 26.)

The question of the endemic prevalence of plague in the East, and especially in Egypt and the neighbouring countries of North Africa (the "Lybia" of ancient times) and in Syria, which Rufus and his authorities have shown to be the home of plague, leads also to the inference that the disease was carried thence into Turkey in Europe, into Asia Minor, the Caucasus, Armenia, Persia, and Arabia. It is certain that the epidemic prevalence of plague in these countries always concurred with the general prevalence of the disease in its "home," although the sickness showed itself only at intervals in them, sometimes, indeed, of thirty years.

That plague was indigenous to European Turkey appears to me very doubtful, although no positive conclusion can be stated on the matter. The intimate and complicated communications between this country and Egypt, and with the near lands of Asia, rendered it liable to constant importations of the disease, and these probably occurred notwithstanding the most vigorous measures of quarantine, at all times the sheet-anchor of Turkish sanitary police. That the home of plague must not, however, be too much circumscribed is shown by the experience of the disease which has been forthcoming since the year 1867, and which furnishes evidence, moreover, that there had not been that complete extinction of plague since 1843 as had been supposed.

In the beginning of the year 1867 there broke out in Mesopotamia among an Arab tribe, living in the marshy district of Hindieh on the west bank of the Euphrates, south of Hillah and east of Kerbela, a very grave epidemic malady, which attacked five localities, and which, continuing from January to June, among a dopulation numbering some 1,000 souls, killed about 300.[1] Soon after the appearance of this sickness the localities in which it had shown itself were visited by a Sanitary Commission from Bagdad, which, after an examination of the character of the malady, came to the conclusion that it was true bubonic plague. Nevertheless it was decided by the Porte to send to the scene of the outbreak, for the purpose of further inquiry, Dr. Naranzi, a physician familiar with Turkish sanitary work. He visited it some time after the cessation of the disease, but got together such information as could be obtained of its nature and progress from the sheiks of the decimated tribe. This inquiry extended to several places in Mesopotamia, namely, the district surrounding Bagdad, Kerbela, Kalés, Bakouba, and others contiguous to the Persian frontier, where malarial fever is endemic. From 1856 to 1865 cases of fever with glandular swellings in the groin, the armpit, and the neck, but little fatal, had occurred here and there in these districts. In the year 1867 this kind of fever, which, according to Dr. Naranzi, agrees with the description given by the Arabs of the presumed plague, became epidemic, but even then it manifested only in a very limited degree, if at all, contagiousness. Hence he concluded that the outbreak in the Hindieh district was a modification of the endemic marsh fever of the country, which had nothing in common with Oriental plague, other than the bubonic swellings, and to which he gave the name of "typhus loimodes." [1]

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[1] Respecting this epidemic see Colvill, *The Lancet*, 1867, July 27, p. 111; Tholozan, *Gazette Hebdomadaire de Médecine*, 1868, Nos. 49 and 52; 1869, Nos. 2, 3, 4; Naranzi, *Gazette Médicale d'Orient*, 1868, July, p. 57, and August, p. 72

Dr. Naranzi admits that his data were doubtful from the difficulty of obtaining straightforward answers from the natives, and from their dislike of sanitary matters leading them to concealment of facts. On the other hand, the symptoms of the disease, as described by the Bagdad Commission from actual observation at the time of its prevalence (namely, ardent fever, delirium, vomiting, buboes, petechiæ, and occasionally carbuncles), fully justify the opinions of Drs. Colvill, Tholozan, Coindet, and Barozzi, as to its being plague.

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Barozzi, the same journal, 1869, March; Coindet, *L'Union Médicale*, 1869, No. 112.

[1] Dr. Naranzi's views correspond with those of Dr. Witt, a Russian army-surgeon, who in the Russo-Turkish war of 1828-29 was sent into Wallachia to superintend the sanitary arrangements of the Russian army on account of plague having broken out in it. He came to the conclusion that the reputed plague was a modification of the Wallachian malarial fever.

Four years had barely elapsed after the outbreak in the marshy districts of Hindieh, on the Euphrates, when another outbreak of plague was reported. This time the disease appeared in the western portion of Persian Kurdistan, which had suffered from it in earlier epidemics. Here plague broke out in the mountainous district of Mukri (province of Azerbijan), situated to the south of Lake Urumiah. First observed in December 1870, the disease extended in the course of the following month southwards towards Bana, near to the Turkish frontier, and it continued to prevail until September 1871, when it disappeared.[1] In this outbreak the plague was so murderous that several villages were entirely depopulated. The inhabitants of the infected district fled to the mountains in search of safety, which they there found. In Bana, a town of about 4,000 inhabitants, by the isolation of the sick and the evacuation of the pest-foci in the town, the ravages of the epidemic were so controlled that only about 100 cases occurred, of which 55 ended fatally. A less dependable statistical return shows that 17 places were attacked with plague in this outbreak, having a total population of 7,000, of whom 1,200 sickened with the disease and 900 died. There is not much likelihood of error as to the nature of a disease presenting so formidable a proportion of deaths among persons attacked with it. Moreover a Persian medical commission visited the infected district at the time of the outbreak, as also the Turkish sanitary delegate (in Teheran) Dr. Castaldi, and their reports leave no doubt that the disease was true bubonic plague.

The next outbreak of plague occurred in the winter of 1873-4, when the disease reappeared in Mesopotamia, in the same district which had been attacked in 1867. This outbreak, which began in December 1873, was of a much more serious character than the previous one, inasmuch as the disease spread on both sides of the Euphrates, from Dagarra, its starting-point, westerly to Kerbela and Meshed Ali on the border of the Syrian desert, northwards to Hillah, and southwards to Diwanieh.

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[1] See as to this epidemic Tholozan, *Gazette Médicale de Paris*, 1871, No. 52; Castaldi, *Journal de Médecine de Bruxelles*, 1872, March, April, and June; *Bartoletti*, the same journal, July, p. 35.

This outbreak came to an end in June 1874.[1] The physicians from Bagdad and Teheran, whose duty it was to investigate the disease, were most decided in their opinion that it was plague. This recurrence still further weakened the arguments of Dr. Naranzi as to the nature of the outbreak in 1867. The records of seizures and deaths during the outbreak of 1873-74 are little trustworthy, for in order to avoid isolation and other measures of quarantine, the inhabitants of the infected district concealed its presence as much as possible from the authorities. But it is estimated that 4,000 deaths from plague took place among a population, which numbered, it is judged, 80,700. After the cessation of this outbreak, Irak Arabi remained free from plague only half a year. In the winter of 1874-75 the disease appeared afresh, in a more virulent form, and spreading over a larger area than in the previous year; it continued until the summer of 1875.

Contemporaneously with the prevalence of plague on the banks of the Euphrates, the disease showed itself in two other and widely distant places in the East, namely, in Arabia, and on the coast of Tripoli. In Arabia the disease appeared, in March 1874, in a mountainous district of North Yemen—the Assyr district —and spread thence to within a few days' journey of Mecca. This outbreak, which was severe, ended in September of the same year.[2] In Tripoli the district of Bengazi, which had suffered from plague in 1858, was again attacked.[3] Here the disease appeared in the month of April amongst several Bedouin tribes encamped at Merdj, on the site of the ancient Græco-Libyan city of Barca, about twenty hours distant from the coast. In the village of Merdj the disease appeared in May, and spread thence generally towards the town of Bengazi. According to Dr. Arnaud there occurred among Bedouin encampments and villages attacked, the inhabitants numbering altogether 424 individuals, 263 cases of plague, of which 108 died. In the village of Merdj nine-tenths of the inhabitants, namely 270 individuals out of 310, sickened of plague, and a third of these (100) were killed by it. The epidemic came to a close in the middle of September. After the very complete accounts of Laval and Arnaud of the disease which was epidemic in Bengazi in 1874, it is not possible to doubt its nature, and it is reasonable to infer that the disease prevalent in the same district in 1858 was also plague.[1]

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[1] Respecting this epidemic see Tholozan, *Compt. Rend.* 1874, lxxviii. No. 8, lxxix. No. 24; Castaldi, *La Peste dans l'Irak Arali*, in 1873-4. Constantinople, 1875.

[2] According to Dr. Buez, *Gazette Heb. de Méd.* 1875, No. 4, in five localities of the Assyr district 270 individuals were killed by the plague out of a total population of 1300. From the same source we learn also that plague had prevailed in the Assyr district in 1853.

[3] See the *Gazette Heb. de Méd.* 1874, No. 40, and the communications of Laval and Arnaud in Arnaud's *Essai sur la Peste de Benghazi*, 1874. Constantinople, 1875.

These occurrences [2] prove that, notwithstanding the cessation of plague in Syria, Egypt, and Turkey for several decenniums, the belief in its extinction was an illusion. The questions now arise whether Europe is endangered by these reappearances of the disease; and if so, what are the best measures that can be taken to ward off the danger.

In the previous summary of the history of plague, from the earliest records to the middle of the present century, the opinion has been expressed that neither Mesopotamia, Persia, nor Arabia was a home of the epidemic, but that each of these countries, when it had suffered from the disease, had derived it from Egypt, Syria, or Anatolia (Asia Minor). The several recent reappearances of plague completely refute this view. Since 1844 not a trace of plague has been observed within the territories which have been hitherto regarded as the exclusive home of the malady. Any introduction of the disease into Mesopotamia, Persia, or Arabia from these countries is wholly out of the question. No closer connection appears between the several recent reappearances of the disease (ten years, in fact, intervened between the first of them at Bengazi and the earliest of the subsequent appearances), and these later manifestations show not the smallest connection with each other. Still less can it be admitted that these newer outbreaks are recrudescences of the disease from germs deposited in previous outbreaks. If this view were held, it would have to be conceded that the plague-virus may remain dormant over thirty years (as for example in Mesopotamia and Persia, which had been free from the malady for that period of time). We are therefore driven to the conclusion that these late outbreaks of plague have their origin in conditions peculiar to the localities in which they occurred; that like conditions with those which determined the endemicity of plague in Egypt, Syria, and Asia Minor determined also its prevalence in Arabia, Persia, and Mesopotamia; that true plague-foci exist in the last-named countries as aforetime existed in the former; and that although the recent appearances of the disease have been comparatively circumscribed, we must not lose sight of the fact that they may be the starting-points of a wider diffusion of the disease.

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[1] [For a more detailed account, from official sources, of the several later outbreaks of plague, described by Dr. Hirsch, see Mr. Netten Radcliffe's *Memorandum on the Modern History and Recent Progress of Levantine Plague*, *Report of the Medical Officer of the Privy Council and the Local Government Board*. New Series, No. VII. (1875) p. 821.—TRANSL.]

[2] While this article was in preparation for the press, news was received of plague having broken out afresh, and over a much wider area, in the district adjoining Bagdad; but details of the outbreak were not forthcoming at the time.

With respect to the conditions which have determined the later appearances of the plague in Mesopotamia, Persia, and Arabia, we are hardly in a better position for forming a correct judgment than with regard to those which occasioned its previous prevalence in Egypt, Syria, and Asia Minor. It has not been possible to unravel all the etiological elements of the disease during the short period of its later prevalences. In Bengazi the weather was unseasonable, in Irak-Arabi there were exceptional inundations of the marshy districts, and in both places a deficiency of food and famine from failure of the harvest existed at the time of the appearance of the disease; and Arnaud considers these conditions as principally concerned in the outbreak of 1874 in Bengazi. Why these conditions were not always followed by the same result in the localities in which plague appeared is not explained, and Arnaud simply observes on this question "that it is difficult to give a solution." Tholozan has justly protested against such a method of dealing with an etiological problem. "The solution of sanitary questions," he remarks, "should rest not upon suppositions or theoretical notions devoid of foundation, but upon positive and well-established facts;" and he gives, with reference to the notion that plague may originate in famine, the following fact relative to the appearance of the disease in Kurdistan. "To assume," he remarks, "that in Persia, of which a great proportion of the population was carried off by famine in 1871, plague would also at the same time have existed, would have been to commit the illogical blunder of assigning to an occasional cause of an occurrence the occurrence itself. The medical public will readily perceive the fallacy of such an assumption, when it is stated that in 1871 the plague did not exist in Persia, but in a small district *which did not suffer from famine.*"[1] The same sort of facts had been recorded by Castaldi with reference to the outbreak of plague of 1874 in Irak-Arabi. He writes: "Notwithstanding the extraordinary inundation of the past winter, the crops of barley and rice were very abundant, and the tribes were comparatively in easy circumstances when the disease appeared." Again, in the production of plague in Irak-Arabi, primary importance has been attributed to malaria from the marshes of the Tigris and Euphrates. Now with reference to this question, it may be noted that the Nile valley, long free from plague, is a marshy district to which this theory, so to speak, would especially apply; and further, that the mountain plateau of Erzeroum formed at an earlier period an important seat of plague, and that the late outbreaks in Kurdistan and the Assyr district occurred among non-alluvial highlands.

So far as the observations on the recent outbreaks afford an insight into the conditions under which plague is propagated, they all accord in this: *that the disease spreads by personal intercourse, and most probably in the way of commerce, in conjunction with seasonal and social hygienic conditions,* exactly in the same manner as has been recorded of previous epidemics of the diseases in the East. The outbreak of plague in the districts referred to always occurs during the winter (December—February), and always, also, with the setting in of the hot season (July—August) it disappears. In these districts, now as always, the most important conditions favouring the spread of the plague are the hygienic misery of the poorer classes, the filthy state of their dwellings and of their surroundings, and the defective ventilation and overcrowding of houses. Collective observations, carefully carried out, during the last epidemic of plague in Egypt, Syria, Armenia, and Turkey, independently of the question of contagion, prove, as a conspicuous witness (A. Clot. Bey)[1] has declared, that, "of all the conditions of insalubrity involved in the East as causes of the development of plague, these (to wit, overcrowding, filthiness, misery) are the least doubtful. . . . . I have myself observed (he further remarks) that low and damp localities, ill-ventilated habitations, populous towns with narrow and encumbered streets, and the quarters inhabited by the indigent classes, pay the largest tribute to the disease. Thus it is always in Cairo, in Alexandria, in Constantinople that it reigns with the greatest intensity, that it ravages preferentially the populous quarters of the Jews and Armenians, and the crowded streets and suburbs. I have, therefore, come to the conclusion, as regards the local causes of insalubrity, that while insufficient to account for the generation of plague, they exercise a more or less considerable influence upon the intensity of the disease; and further, that these causes exercise no greater influence upon pestilential affections than upon other epidemics, such as yellow fever, cholera, &c." All other observations concur in this view. Prus writes in his *Rapport a l'Académie de Médecine sur la Peste et les Quarantaines*,[2] the result of communications from numerous physicians in the East:—"If we seek with care for the causes which appear to exercise the greatest influence upon the development of plague, we may summarise them as follows: Dwelling upon alluvial or marshy ground; houses low, ill-ventilated, overcrowded; atmosphere hot and humid, putrefying animal and vegetable matters, alimentation unwholesome and insufficient, great physical and moral misery;" and Aubert, on this question, indicates the point of his writings on plague[3] by the motto attached to them, namely: "Civilisation alone has destroyed plague in Europe, and it alone will annihilate the disease in the East."

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[1] *Loc. cit.* p. 53. [Consult Mr. Netten Radcliffe's paper with reference to this question.—TRANSL.]

The facts discussed above agree with the circumstances of the later outbreaks in 1867 and subsequent years. In each succeeding outbreak a further extension has taken place which seems to indicate that plague has entered upon a new era, and that the East is threatened with another invasion of the disease. This danger is the greater from the easier access and more rapid communications which now exist between Mesopotamia, Persia, Syria, and Turkey. Should the plague extend along the routes which follow the course of the Euphrates and Tigris, towards Syria, Armenia, and the Caucasus, Asia Minor and European Turkey will be exposed to great danger from the malady. The same holds good as to danger from the Assyr district with respect to the West Coast of Arabia, and especially with regard to Mecca; and should the danger there concur with the great pilgrimage at the time of the Bairam festival, an extension of the disease to Egypt and the North Coast of Africa would be imminent. The possibility of the disease following such a course is consistent with the knowledge which exists of its earlier movements. Had plague, indeed, taken a greater hold of the populations and districts which have been attacked during its recent manifestations, Europe would have been exposed to the introduction of the disease, the circumstances favouring the event equally, if in fact they be not greater, than those which existed in the first four decenniums of the century.

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[1] *De la Peste Observ en Egypte.* Paris, 1840, p. 219 *seq.*

[2] Paris, 1846, p. 26.

[3] *De la Peste ou Typhus d'Orient.* Paris, 1840

The disappearance of plague from Egypt, Syria, and Turkey in 1840-43 followed upon certain hygienic improvements in the localities in which it was liable to prevail, improvements involving purification of the soil, the houses, streets, &c. But it must not be forgotten that these ameliorations of the sanitary conditions under which the population was placed touched only a very small portion of the countries in which plague had been endemic. At the present moment, in by far the greater proportion of their extent, the hygienic conditions under which their populations live differ in no wise from those which aforetime existed when plague was never absent from them. There is now as great misery and as great barbarousness among the inhabitants as there was at the beginning of the century. We can have little confidence that the dying-out of plague over a hundred square miles of territory in 1840-43 was a result of hygienic measures, and we cannot flatter ourselves that the disease reintroduced there would not find a fertile soil for its development

Europe in several respects is differently situated in this matter. A well-organised quarantine maintained against plague by land and by water during the past and at the beginning of the present century contributed not a little to the ultimate freedom of the Continent from the disease. A not less important element in bringing about this desired result has been the constantly increasing care given here to the performance of public health duties. With the advancement of rational sanitary practices plague gradually retreated from Europe, and in the end it maintained its ground only in those countries which had remained unaffected by modern civilisation and its blessings; but even here it continually yielded. Guided, therefore, by the lesson which these facts teach of the value of hygienic measures in limiting the ravages of plague, we cannot lay too much stress upon the importance of developing and carrying such measures out now that the question has to be confronted of Europe being again endangered by the disease.

Notwithstanding the history of the disappearance of plague from Europe, and the apparent causes thereof, we are not justified in assuming that we are wholly secure from its recurrence. The first condition of the dissemination of plague from its home is the carriage of the poison of the disease, and, in this respect, Europe is more unfavourably circumstanced than it was forty years ago. For since then communication with the East has become a hundred times easier and quicker, and in proportion as the facility of intercourse has become greater, has quarantine as a safeguard become untrustworthy, and, in fact, impossible or illusory. Moreover, should plague break out in the eastern provinces of Turkey or Russia, independently of the chances of introduction of the disease in the course of commerce by way of the sea, Europe would be also endangered by way of the land.

*The exposure of the Continent to the growing danger of an invasion of plague lies especially in these circumstances, and the prospect of this danger calls for a perfecting of all those public sanitary arrangements which afford the securest protection against the evil.*

It would be foolish for European nations, and especially for Germany, to become alarmed at this peril; it would be still more foolish for them to neglect it and become reckless of the danger because of its seeming remoteness. The history of the disease furnishes sufficient warning. Let it be remembered that this sickness took thirteen years to travel from its home into other districts of Asia, and that the inhabitants of European countries only began to trouble themselves about it after it had commenced to spread in a broad stream over the east of the Continent. Remember also the enormous cost of the efforts made at the beginning of the present century, by isolation and quarantine, to arrest the progress of the malady, and the disturbance of commerce occasioned by these and other measures. Let it not be forgotten that since that time more than half a century has passed, during which international commercial relations have been so largely developed as to make absurd the conception of an isolation of Europe from the East. What is now necessary to be commonly understood on this subject is this:—That *the most certain means of controlling plague, as indeed other epidemic infectious diseases, is a well-ordered public sanitary administration.*

# THE PRACTITIONER.

OCTOBER, 1877.

## Original Communications.

### ON THE USE OF IRON IN EPILEPSY.

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THE influence of iron in epilepsy is a point of considerable practical importance in the treatment of that disease, since epileptics very frequently present symptoms which are supposed to indicate the need for iron. Dr. Fothergill, at the conclusion of his suggestive paper in the last number of the *Practitioner*, mentioned Dr. Brown-Séquard's opinion, that iron, although it improves the health of epileptics, increases the frequency and severity of the fits. For some years past I have watched very carefully the influence of iron in this disease, and the conclusion reached affords only a partial support to Dr. Brown-Séquard's opinion. The effect of iron seems to me to differ very widely in different cases of epilepsy, so that no general statement can be made to which the exceptions are not extremely numerous. The most important facts regarding its action may, I think, be thus summarised:—

1. In a certain proportion of cases of epilepsy, which are probably a minority of the whole group, iron does increase the frequency and severity of the fits.

2. In a large number of cases iron may be given without any recognisable influence on the attacks.

3. In many of the cases in which its effect is injurious, the increase in fits does not occur until after the iron has been taken for some weeks, and in some of these cases the first effect of the drug is to cause a diminution in the frequency and severity of the attacks.

4. In some cases this beneficial effect, instead of being transient, is permanent; and great benefit results from the continued administration of iron, so that by its use alone, some cases may be cured, as far as the affection can be said ever to be cured by drugs.

Before mentioning some illustrations of these statements, it may be well to allude to certain difficulties which beset the attempt to ascertain the influence of iron, not because I think for a moment that they have been overlooked by those who have expressed an opinion on the subject; but because the sources of fallacy and the difficulty of avoiding them, have been so strongly impressed upon me, that I think it may be of service to other observers to point them out.

The first of these is the natural variation in the frequency of the fits which many cases present, and the necessity for ascertaining and allowing for this in drawing an inference. This is so obvious a caution that it need only be mentioned. Another source of error, much more liable to mislead, arises from the influence of bromides on epilepsy. Even when patients are having fits with frequency under bromide treatment, it constantly happens that on the discontinuance of the bromide the fits increase in frequency. This is often the case even when there has been, under bromide treatment, an initial improvement and a subsequent increase in the fits up to the frequency with which they occurred without treatment. No conclusion as to the prejudicial effect of iron can be drawn from an increase of the fits when it is substituted for bromide. The iron must be given to a patient who is having no treatment at the time the iron is commenced, or it must be added to the drugs the patient may be taking, if an increase in the fits is to be justly ascribed to the influence of the iron. The fallacy is not altogether avoided, even by commencing the treatment by iron; it is rare nowadays to meet with an epileptic who has not taken bromide largely, and the bromide treatment is often continued up to the time at which the patient comes under observation.

The statements made above are illustrated by the following cases, occurring among my out-patients at the National Hospital for the Paralysed and Epileptic. They are briefly stated, but I preferred to illustrate by cases taken from out-patient practice, of which the accounts are necessarily brief, in order to avoid the source of error from the effect of the various complicating influences on patients under treatment in the wards.

I do not mention any case in which the fits were rendered more severe by iron, for the fact rests on too good authority to need corroboration.

The first case illustrates that the addition of iron to bromide treatment may be attended with marked improvement for a considerable time.

A girl, aged 14, had had fits from infancy, and they occurred in batches of several fits, on two or three days of each week. Bromide in various combinations was tried without much improvement: iron was then added to the same dose of bromide which had been taken before, and the fits ceased, and she remained free from them for several months. After a time, however, they recurred, and she subsequently had about the same number of fits on bromide with various vegetable sedatives and with iron.

The next case is one in which, after fits of long duration had ceased under bromide treatment, a long course of iron treatment produced no recurrence.

A girl, aged 17, had suffered from right-sided fits with loss of consciousness from the age of 3 years. Several seizures occurred daily. At first bromide alone was ordered: the attacks became less frequent and slighter. After three months belladonna was added to the bromide and the fits ceased entirely. When she had had no fits for three months, a quinine and iron mixture was substituted for the bromide, on account of general languor, and was continued for six months without any recurrence of the fits.

The following case is one in which peculiar attacks, resembling *petit mal,* were apparently cured by iron.

A married woman, aged 48, came under treatment in February, 1873, on account of "fits" which had occurred during the preceding two years. There was a family history of fits and insanity. The attacks occurred chiefly at the catamenial periods. Only an imperfect history of their character could be obtained: she described them as being sudden attacks of inability to move or speak, lasting a few seconds, and suddenly passing away. In some it appeared that consciousness had been lost. The catamenia had not ceased; the urine was free from albumen. Tr. ferri perchl. ♏ xv. three times daily was ordered. During the next two months she had a few slight attacks: they then ceased, but afterwards recurring, the dose of the perchloride was increased to ♏ xx. and the fits ceased; after two months she left off the treatment, and remained free from fits for a year and a half. They then returned, also at the catamenial periods, but were arrested by bromide, and she remained free, without treatment, for twelve months. On their second recurrence she came to the hospital, and iron was again ordered, and taken for three months without a single attack occurring. She then ceased attendance.

In the next case fits which were characteristically epileptic appeared cured by iron.

A single man, aged 23, had his first fit five months before he came under my care. No cause could be assigned for it. There was no history of family tendency to disease of the nervous system, of sexual excess, or of syphilis. His heart and optic discs were healthy, his bowels regular. The interval between his fits was rather less than a week. They occurred usually at night; and were preceded by no warning. Consciousness was lost, and the convulsion severe, his tongue being often bitten. He was ordered Tr. ferri perchlor. ♏ x. three times daily. During the next month he had only one slight attack. During the following month he had no fit; during the third month he had only one fit; during the succeeding three months he had not a single attack, and he then ceased attendance. During the whole of this time he took the iron only. After ceasing to take it he remained free from fits for four months. The fits then returned, and three months later he came again to the hospital, having the fits "as bad as ever." He was again put on the perchloride of iron, and the fits at once ceased; he continued to attend the hospital for three months more, and during that time had not a single attack.

Attacks accompanied by co-ordinated spasm were in the next case much lessened by iron.

A boy, aged 8 years, had had "fits" since four years of age, the first having occurred without known cause. He was strong as a baby, but was less strong after an attack of whooping-cough at three years of age. There was no evidence of worms or of masturbation. The attacks occurred with increasing frequency, several daily for a week, and then a week without. They always occurred in the day-time, never when asleep. The attack commenced with a pain at the chest and coughing, and consisted, according to the father's account, of violent struggling, alternating with extreme flexure of arms and legs. There was no apparent loss of consciousness; he talked wildly the whole time, but remembered nothing afterwards. After lasting five minutes he generally went to sleep, slept for a quarter of an hour, and on waking passed into another similar attack, and so on for an hour or two. They were brought on occasionally by excitement. He was ordered Syr. ferri phosph. co. ♏ xx. three times daily. During the next month he had not a single attack, and in the succeeding three months he had only one slight attack each month. Bromide was then substituted, and the attacks ceased entirely for six months, and then recurred for a short time.

In the following case, epileptoid attacks, with much co-ordinated spasm were arrested by iron.

A pale, delicate-looking lad, aged 12 years, with a strongly phthisical family history, had his first fit nine weeks before he came under my care. The fit occurred while at work stripping tobacco leaves, an occupation at which he had been engaged only two weeks, and which made him feel sick. No worms had ever been seen. The attacks had recurred frequently; he had had four in the week before he was first seen. Their character (according to the account carefully and repeatedly obtained) was peculiar. Each was preceded for a few minutes by an aching in the left eye, and it was said that the eye sometimes became red: he then fell unconscious, the face being not pale, but flushed; there was first violent "trembling" of his limbs, and then co ordinated movements in which he would sometimes struggle, and clutch, and try to bite, and sometimes put his head between his legs and remain rolled up in a ball. His left pupil was a little larger than the right; the optic discs were full tinted, certainly redder than the average, but within the range of health. Tr. ferri perchloridi ♏ x. was ordered three time a day. In the following two weeks he had only one fit each week, instead of four. The medicine was then omitted for a week, and he was brought to the hospital with the statement that he had had a fit every day whilst he was not taking the medicine. During the following month the medicine was taken rather irregularly, and the boy's mother asserted that the fits ceased when it was being taken, and as soon as it was omitted they recurred. During the following month it was taken more regularly, and the boy had only two fits. There was no alteration in the ophthalmoscopic appearances. The dose was then increased to ♏ xv. During the first fortnight after the increase there were no attacks; during the next, apparently from some accidental cause, there were five. The iron was, however, persevered with, and for five months he had not a single fit. He remained pale and delicate in appearance, and on the medicine being discontinued he had some more attacks, which ceased when the iron was resumed.

The object of this paper is simply to establish the fact of the variations in the effect of iron in different cases of epilepsy and its occasional beneficial influence. With regard to the indications for its use, I can only at present say that it is certainly most frequently useful in the anomalous forms of epilepsy which stand midway between epilepsy and hysteria, and have long been known by some mixed term. Such forms are described in the last two cases, in which co-ordinated and apparently purposive spasmodic movements are part of the phenomena of, or commonly succeed, the "epileptic" portion of the attack. Whatever be the exact nature of these cases, many are certainly benefited in a remarkable degree by iron. The cases narrated show however that it may also do good when the attacks are of a more purely epileptic type. Anæmia, as an indication for the use of iron is, I think, of less value in epilepsy than in other diseases. The facts I have adduced suggest the conclusion that iron has an influence on the nervous system analogous to that exerted by zinc, silver, and some other metals, and that it is to this rather than to its hæmatinic influence that the beneficial effects of its administration are due.

# THERAPEUTIC NOTES ON THE CHLORIDE OF CALCIUM.

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I HAVE for many years both in my own family and in practice, employed a solution of the chloride or muriate of calcium in certain cases, in which I have come to regard it as possessing quite the character of a specific. Previous to the year 1825, when iodine and its salts were introduced by Coindet, Lugol, and others as *the* remedy for strumous diseases, the profession trusted almost exclusively under similar conditions to the chloride of calcium, commonly known as the muriate of lime, and which must not be confounded with the chloride, more properly the hypochlorite of lime, or the bleaching powder of commerce.

An officinal solution of the chloride of calcium long held a place in the pharmacopœias of London, Edinburgh, and Dublin, although I find, on referring to the only copy of the first-named work within reach, that it had been withdrawn at least as early as 1851. In the *Materia Medica* of Dr. Frazer of Dublin, of 1864, this salt and its saturated solution are stated to be only used "to dry gases and liquids," and as tests for oxalic acid, and citrate of potash. Although chloride of calcium has a place among the *Materia Medica* in the British Pharmacopœia, yet no officinal formula is given for a solution. Nothing illustrates more fully the extent to which the influence of what can only be called fashion prevails in therapeutics, as in other perhaps less important matters, than the almost complete oblivion into which this old and faithful servant has been consigned under the favour accorded to its successful rivals iodine and cod-liver oil. Although latterly deprived of official recognition, I have no doubt it retained its good character with many of the older conservative practitioners. In 1870, when I recommended it in consultation with Dr. Hugh Rees, then of Llanberis, the prescription was made up at once without difficulty by a druggist in Bangor from an imposing-looking bottle of the old London officinal solution. It is well known that my lamented friend, the late Dr. Warburton Begbie, had the highest opinion of this remedy, which he told me he had derived from his father's recommendation. On one occasion, some three years ago, he showed me in his consulting room the case of a young lady, in which he had succeeded, with the continued use of the solution of the muriate of lime, in procuring the absorption of the greatest enlargement of the cervical glands on both sides he had ever seen, and which had previously resisted long and repeated courses of cod-liver oil and the iodides. The young patient was a typical specimen of the olive-complexioned struma, and the axillary and femoral glands had also been involved, but to a much less degree. I myself have again and again seen chronically indurated and enlarged glands, amounting in many instances to deformity, yield even in adults, to the steady internal administration of this salt. I have been frequently struck by the softening without diminution of bulk, which precedes the commencing discussion of the tumour. There is at present a domestic in the Royal National Hospital here, who is a striking instance of the good effect of this drug. She originally presented herself as a patient with an enormous hypertrophy of the glands on the left side of the neck, quite disturbing the axial position of the head and face, which had previously resisted all treatment, but readily yielded to the chloride of calcium.

The almost invariable tendency of iodine and its salts to occasion inconvenience from the development of their physiological symptoms, their proneness to cause dyspepsia and disturbance of the functions of the mucous surfaces generally, and above all their liability to induce, when long continued, emaciation, and also absorption, more especially of the osseous structures, greatly impair their otherwise valuable properties, and limit their employment, particularly in young persons. It is of course in the latter we are so often called upon to treat the various outcomings of the strumous diathesis, and it is precisely in this class of ailments that the chloride of calcium will be found to possess therapeutic properties, which render it altogether a much more potent, and certainly more manageable remedy than any of the various preparations of iodine. I do not mean for a moment to disparage unnecessarily the valuable properties of the iodides in purely strumous, or tubercular affections, but even if their employment were unattended with the inconveniences above mentioned, yet it is well known how desirable it is to have an alternative remedy, and that one of equal efficacy. But it is when associated as an external application with the chloride of calcium given by mouth, that the best results are to be seen. The iodine can be thus used in either or both of two ways. First, the tincture painted over the cutaneous aspect of the hypertrophied structure, and when dry, covered with olive oil, which prevents the evaporization of the iodine, and causes it to be absorbed; or by exposing the patient at night to an atmosphere saturated with iodine, which is easily done by refreshing every night with a teaspoonful of the tincture of iodine, a shallow dish of water exposed in the patient's bedroom at a level higher than the head. I have long carried out this plan of treatment with most satisfactory results in a large number of instances.

It is not, however, only when glandular enlargement proclaims that the scrofulous cachexia has been developed, that chloride of calcium is of service. In those premonitory derangements of the digestive and assimilative processes, which in delicate and predisposed constitutions so constantly precede or favour, if they do not indeed directly cause, the appearance of the more characteristic lesions of the strumous diathesis, the chloride of calcium is of the greatest use. In children and young persons when the sleep becomes restless and troubled, the breath fetid, the tongue foul and coated, the tonsils enlarged, the evacuations irregular and offensive, with deficient secretion of bile, I know no remedy approaching it in value. The colliquative diarrhœa, which so often accompanies this condition, and above all that obstinate lientery which is seen with hypertrophy of the mesenteric glands, yield to the solution of the chloride of calcium like a charm. In pronounced tabes mesenterica, the usual sequela to the condition above described when neglected, it is equally efficacious. I have also found this remedy of great use in controlling and modifying the characteristic alvine discharges in enteric fever. In fact turpentine stupes to the abdomen, and the solution of the chloride of calcium in milk internally, are what I have for long mainly trusted to in the treatment of the milder uncomplicated forms of typhoid. I was first induced to use the salt in such cases nearly ten years ago, when I was called in to see a household, all the members of which, to a more or less extent, showed evidences of sewage poisoning in the shape of headache, sickness, and diarrhœa, but in only one of whom the typical febrile movement became developed. Their symptoms all yielded rapidly to frequent small doses of the solution of the chloride in milk.

Since writing the above, my attention has been called to the paper of Dr. Bell of Glasgow on the muriate of calcium in the *Lancet* of the 25th of August of this year, one of the numbers unopened during my annual holiday. Unlike him, I have found no difficulty in prescribing this salt. I have simply ordered a solution of the strength of the old Edinburgh Pharmacopœia, in which form my acquaintance with the remedy first began. It is important to remember, that it should always be made of the crystallized or hydrated chloride of calcium, as the ordinary crude anhydrous salt gives a turbid appearance and an unpleasant caustic taste to the preparation. The Liquor Calcii Chloridi of the old London Pharmacopœia consists of a solution of ℥jv. of the *fused*, or anhydrous chloride of calcium in fluid ℥xjj. of distilled water. In the Edinburgh Pharmacopœia the Solutio Calcis Muriatis is composed of ℥viij. of the *crystals* of the salt in fluid ℥xij. of distilled water. The Aqua Calcis Muriatis of the Dublin Pharmacopœia holds two parts of the *dry* muriate of lime in seven parts of water. Neligan, in the fourth addition of his *Materia Medica*, made the strange mistake of stating that the Edinburgh officinal solution is two and a half times the strength of the Dublin preparation, forgetting that the latter is made of the dry or anhydrous salt and the former of the crystallized or hydrated salt, the water of crystallization of course almost equalizing the proportions. I think the old Edinburgh pharmacopœial solution will be found at present the most suitable, and it is certainly the most palatable. The dose for an adult should vary from twenty or thirty to fifty minims in a wine-glassful of milk three times a day or oftener, according to the nature of the case, and should be taken, if possible, after food. When there is sickness or irritability of the stomach and bowels, the smaller dose more frequently repeated, and the vehicle warmed, will be found advantageous. Cod-liver oil is of course as valuable a companion to the chloride of calcium in appropriate cases, as it is to the iodides.

A very good account of this salt will be found in Christison's *Dispensary*, and also in the works of Pereira, Waring, and Squire, who, strange to say, each give a different strength to the Dublin officinal solution, which is the only one of the three quoted by the two last-named authorities. It is unnecessary here to endeavour to explain the mode of action of the chloride of calcium, in the morbid states over which it seems to have such a powerful influence. In the older works on *Materia Medica* it is classed among the *Liquifacients and Absorbents*, but this offers no explanation of its exact *modus operandi*, which must be looked for in the nature of the chemical constituents themselves of the salt. The activity of the chloride compounds generally is well known. The antiseptic properties of chlorine, and the important part played by the chlorides in digestion, need only be mentioned, while the assimilative mobility, if I may be permitted the term, of lime in the nutritive processes of the animal economy, especially of the young, points it out also as a most important agent. In the strumous diathesis there is quite a characteristic tendency to textural instability in all those structures into the formation of which lime enters. There seems to be either an excessive elimination, or a defective assimilation of that material, perhaps both conditions may co-exist, but the good effect of throwing into the system an excess of this element is recognized by every one who has watched the progress of such cases under treatment by appropriate salts of lime.

This leads me to refer again briefly to the vehicle of administration of the chloride of calcium. Milk is in every respect the best, as indeed it should be, regarded as a cardinal element in the dietary of such cases as indicate the use of the chloride. I am inclined to think that when the solution of the chloride of calcium is put into the milk, some chemical decomposition takes place under the influence of the lactic acid present. At all events a slight odour of chlorine becomes perceptible in the mixed liquids, which does not present itself in the officinal solution of the salt. Next to milk, syrup is the best medium, and bearing in mind the vastly augmented solubility of lime in the presence of sugar, I would venture to suggest the adoption for general use of a syrup of chloride of calcium composed of ℥v. of the crystalized salt in fluid ℥xij. of syrup, of which the full dose would be a teaspoonful, which of course could be as readily given in milk.

# ON THE INFLUENCE OF SEA-VOYAGES ON THE HUMAN BODY, AND THEIR VALUE IN THE TREATMENT OF CONSUMPTION.[1]

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(*Continued from* p. 188, vol. xvii.)

## V.—ON THE INFLUENCE OF SEA-CLIMATE AND SEA-LIFE ON THE CONSTITUTION IN GENERAL, AND ON THE HEALTH OF SAILORS AND PASSENGERS, PARTICULARLY IN CONSUMPTIVE INVALIDS.

ORIGINALLY I intended to begin this chapter with a sketch of the principles of the climatic treatment of consumption. But I found that I had more to say on this subject than could be conveniently compressed into a moderate compass, and therefore will treat it in a separate paper.

The discussion of the physiological and therapeutical effects which sea-climate and sea-life have on the constitution has been allowed to stand over from the fourth chapter to this place, as it is intimately connected with the question of the value of sea-voyages in the treatment of consumption.

Putting aside local differences and peculiarities, the qualities of *sea-climate,* whether at the sea-side or on the high seas, of most interest to us are: first, a relatively *large* amount of *atmospheric moisture.* Taken by itself, and leaving out other influences to be mentioned later on, which have a greatly modifying effect, moisture, together with a *high atmospheric pressure,* such as obtains at the sea-level, has a relaxing, or, from a therapeutical point of view, a sedative effect. At the same time evaporation from the skin and lungs being less under their influence, the secretions become more fluid; and a viscid sputum, for instance, which an invalid has great trouble in bringing up, becomes more watery and easily expectorated at the sea-side. But for the same reason catarrhs are more frequent and more obstinate than in a drier climate. Leucorrhœa, for instance, is a most common, one might say endemic, disorder in certain parts of Western Europe which have a sea-climate.

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[1] We are glad to be able to present to our readers the continuation of Dr. Faber's valuable papers on this interesting subject after a prolonged but unavoidable interruption, circumstances having rendered it impossible for him to continue the series at the time the break occurred. We believe these papers will be especially acceptable at this season when the question of what is to be done with a consumptive patient is so frequently put to the practitioner.—ED. *Pract.*

Not only do catarrhal secretions flow more freely, but according to Ludwig, the eminent physiologist, carbonic acid is more freely exhaled from the lungs in a moist atmosphere.

Another characteristic of the sea-climate is its *equability*. The annual as well as the daily range of temperature is comparatively small. This is another element in the relaxing or sedative influence of the sea-climate.

The weather, on the contrary, is more unsettled in a damp than in a dry climate, and the intensity of light is less.

When combined with a *high air-temperature,* the effect of a damp climate is relaxing and oppressive in the extreme. Under such conditions the machinery of the body is working at its lowest rate,—the steam as it were being at the lowest possible pressure in the living engine.

The profuse perspiration evaporates so slowly from the surface of the body, that the body is constantly bathed in it, and the usual cooling effect of evaporation is greatly diminished. This condition is experienced in its purest form and greatest intensity in an equatorial calm on the high seas. But one may get at least a faint idea of it even in European waters, when there is a succession of hot and calm days, such as I have seen in the English Channel, for instance. There is therefore good reason for fashionable seaside places, with a climate like that of the south coast of England, becoming crowded only towards the latter part of autumn.

A climate combining much atmospheric moisture with a *low temperature,* such as one generally gets only too good an idea of off Cape Horn, has an effect by no means agreeable nor particularly desirable for an invalid. Damp air is a better conductor of heat than dry air; the former, therefore, at the same temperature feels more cold and chilly than the latter. It produces a most uncomfortable impression upon the sensory nerves of the skin, or rather the specific nerves, for such I believe them to be, which transmit the perception of external temperature to the brain, and to which I assign a most important part in the production of those effects upon the whole system which change of climate induces. These nerves dislike, if we may use the term, the impression thus made upon them, and they greatly prefer the sunny winter of Mentone or Egypt to the dull and damp one of Venice or Pau.

Next to the moisture and temperature the motion of the air, in one word the *wind*, is the most important point in determining the physiological and therapeutical character of sea-climate. Supposing the atmospheric temperature to be an ordinary medium one, much atmospheric moisture, with a moderate atmospheric temperature, diminishes tissue-change in the body, but air in motion has the contrary effect of increasing it. All winds, however, have not the same physiological action. There are strong and light, cold and hot, moist and dry winds, with all their gradations and combinations. They all come more or less into consideration on a long sea-voyage, like that to Australia. I cannot here particularize the action of each, and it may suffice to speak of the effects of the ordinary *sea-breeze* which everybody knows from his own experience. In the face of a fresh sea-breeze certainly no one will feel a relaxing effect from the sea-climate; there are, on the contrary, a good many persons, particularly ladies and invalids, that find it "too strong," too stimulating and exciting. The symptoms of this over-stimulation resemble those of the "acclimatisation fever" I have described along with the climatic treatment of consumption.

The action of the sea-breeze, or of any other wind of ordinary temperature, moisture, and strength, is a double one: in the first place, it causes increased production of body-heat by the reaction which occurs from the great cooling it occasions both by directly abstracting heat, and by increasing the evaporation. Secondly, it stimulates the nerves of the skin, particularly those of the head, and thereby communicates an increased tone to the whole nervous system, so that one feels light and buoyant under the influence of a fresh sea-breeze.

This stimulating effect of the sea-climate, which makes itself felt principally in the nervous and digestive systems, may be much increased by sea-baths, if taken judiciously, particularly as regards duration.

I believe it is the happy mixture of soothing and stimulating qualities in the sea-climate that makes so many people, especially invalids, gain weight, strength, and spirits in a most remarkable way under its influence. Its effect is shown by the microscope as well as the balance, for Messrs. Malassez and Picard have found the number of red-blood corpuscles to be increased by one-sixth after a stay at the sea-side. I will not venture to reckon how many milliards of corpuscles this increase may amount to.

As a matter of course the air of places which are resorted to for climato-therapeutical purposes should above all be *pure*. In this respect, however, many of our sea-side places leave much to be desired. Besides unsatisfactory local conditions, the land-breeze in many cases comes over an unhealthy back-country, wafting foul rural and urban emanations towards the sea-shore, and the sea-breeze also may be polluted by the emanations from decomposing animal and vegetable matter, which at low tide often lies exposed in large quantities on the beach or on outlying sandbanks. For the first reason a small island, for the second a steep shore, with just beach enough to admit of bathing, is preferable for our purpose. It is, however, not only at the coast that one may be molested, and his health injured by organic emanations. I have also smelt them distinctly on the ocean, particularly during calms in the tropics, and in the Sargasso Sea.

I do not think that the increased quantity of oxygen, in consequence of the high atmospheric pressure, or the trifle less carbonic acid which we find at the sea-level as compared with higher elevations, has any great physiological or therapeutical action; nor do I attach so much importance as many have done to the admixture of salt with the sea-air as having a resolvent action on the secretion of catarrhal mucous membranes. In this respect, as we have seen already, the moisture of the sea-air is of much more importance.

Now if we take all those different components of the sea-climate, their various combinations and modifications as effected especially by differences in the moisture, temperature and motion of the air, we may form some idea of what a complicated therapeutical agent a long sea-voyage, say to Australia, must be in respect of climate alone; much more complicated, indeed, than any other kind of climatic treatment of consumption on *terra firma.* There is in the case of such a voyage not only the most radical change of life, but also a great variety of different sea-climates, in quick and irregular succession; from the temperate or even cold to the very hottest, and *vice versâ.* In the same manner on such a voyage the character of the wind, the amount of atmospheric moisture, and the other qualities of the sea-climate change frequently and often abruptly.

It would be futile to attempt to determine the effects on the body of each climate during a long sea-voyage. Suffice it to refer, on the one hand, to the physical character of the climate of different oceans and latitudes as given in the first chapter, and on the other to their respective physiological and therapeutical effects as just explained.

It is, however, not only the climate that influences the health of people at sea, the hygienic condition of their ship (see Part II.) and their mode of life, also come into consideration. Therefore, under the same climatic conditions the influence of a sea-voyage on the constitution may be very different with different individuals and classes of people. So this influence, or in other words, the general state of health, the morbility and mortality may be expected to differ, when we compare seamen with passengers, ordinary emigrants with first-class passengers. Such a comparison, based on statistics, I believe to be the best way of approaching a question which is of fundamental importance for our present subject: viz.—*Is sea-life a healthy one?*

(1.) *The Health of the Sailor.*—The notion that the sailor's calling is a particularly healthy one is very common, especially with people whose notions are based more on theory than on practical experience. I have heard one of the most famous physicians of our day advise the parents of a delicate and strumous-looking boy to make a sailor of him. But from what I have seen of a sailor's life in the mercantile marine, I should consider it a rather hard trial to a weak constitution, and one involving the risk of its breaking down completely instead of being strengthened. Take the case even of a midshipman, whose duties are much the same, but whose fare, accommodation and social position are much better than those of an ordinary seaman; and yet it appears a doubtful way of strengthening the constitution of a weakly boy to keep him on watch for four hours every night in every sort of weather, and moreover to have what he has left of a night's rest liable to be broken at any time by the call: "All hands on deck!" As has been shown in the second chapter, the seaman's calling is characterized by irregularity, periods of the hardest work, through days and nights of the worst weather, alternating with periods of comparative idleness. Voyages too often last longer than is good for the constitution, or the intervals between them are too short for getting refreshed in body and mind. Nor is the stay on shore always taken advantage of in the right way; on the contrary, body and mind in many, if not in the majority of cases, are more injured than benefited by it.

An officer's life is under ordinary circumstances more regular than a seaman's; still he too has, of course, to face every sort of weather, and he takes his four hour's night-watch. When I look back I can scarcely say that I have seen any more "pictures of health" among the numbers of officers of the mercantile marine I have met with than among the same number of city clerks.

Still less does the ordinary seaman give the impression of his calling being a particularly healthy one, either to the medical officer of the vessel, who is specially acquainted with his manifold constitutional and local ailments, or to a casual observer. A crew on the whole is generally found, even in first-class ships, to present a stunted, sallow, depressed appearance, for which a sufficient explanation is given in a former chapter (Part II.). It is a remarkable fact, which struck me very early in my sea career, that one sees so very few seamen of advanced age, say above forty. At that age certainly the prime of a man's life scarcely ought to have passed as regards physical strength and ability for hard work. Although most seamen are unmarried, yet their pay (about three pounds a month) is too low to enable them to retire after a number of years from sea-service and live on their savings. Sailors, moreover, are as a rule as much averse to saving as to commencing some other occupation on land. The only explanation of the fact I have mentioned must therefore be that the average duration of a seaman's life, or at least of his continuing to be an able-bodied seaman, is a comparatively short one.

The English merchant fleet, although a matter of private enterprise, is of pre-eminent national importance. It not only enriches the country by importing the products from all parts of the world and exporting in exchange her manufactures, but it also carries the English name and English influence into the remotest parts of the world where a man-of-war seldom, if ever, makes its appearance. It was the English merchants who conquered India; it is the English merchant fleet that connects the distant parts of the great empire on which the sun never sets. England may well be proud of her merchant fleet. It deserves well of her. But the question is, Does England in return do her full duty towards her merchant fleet? In particular, has legislation done everything that might be expected not only for the shipping interest at large, but also for the individual seaman? His is certainly no small share in the merit, as I have just pointed out, and it is hardly earned too. It is not, however, my business, to advocate his cause in any other than a sanitary respect. Is he, then, sufficiently provided for in that respect, and in the case of his falling ill and getting disabled by disease, accident, or advanced age?

These are, I believe, questions well worthy of public attention. As far as the ship's hygiene is concerned, they have been already answered in the second chapter. Here I would further point to a material defect which stands in the way of the sanitary improvement of the merchant marine.

*Sanitary statistics* are most valuable as indicating the direction in which improvement is needed. Now, as Mr. J. Simon informs me, there are practically no such statistics of the health of the merchant marine. The attempts that have been made towards this end appear to be more or less unreliable and contradictory. This will always be so as long as there is no strict organisation in force for taking these statistics. And even then great difficulties will stand in the way.

The merchant marine is scattered all over the world without any organisation and satisfactory control as to whereabouts and sanitary condition whilst abroad. A ship may be away from home for years trading between foreign countries, she may pass into foreign hands, she may be lost and never be heard of. This want of control is not, however, the principal objection; still more in the way of sanitary *statistics on the health of the merchant marine* stands the circumstance that the majority of sea-going vessels have no medical officer on board to make those statistics; and even where there is one, the "health log" is in the hands, not of the medical officer, but of the captain, from whom, of course, one can expect nothing but an entry of the number of deaths, without even giving their causes, not to speak of any morbility statistics.

Valuable information on the mortality and morbility and their causes in the merchant marine might be got, if each medical officer, where there is one on board, could be made to keep complete lists thereof, and to deliver or send them in at the end of the year. From the respective portions of the merchant fleet a calculation might then be made on the health of the whole. The total result, however, arrived at in this way no doubt would be too favourable, as it would be based almost exclusively on the mortality and morbility in first-class steamers and sailing vessels. Thus just that class of vessels which stand most in need of sanitary improvement would escape the control by statistics. For the same reason of their being too favourable, the health statistics of the *navy* are no measure for the health in the merchant marine. The men of the former are a picked body; their accommodation and food are, generally speaking, better; their occupations whilst at sea more regular; their life on shore less licentious; in short, their discipline is better than that of merchant seamen. There is on board every man-of-war at least one medical officer. This latter circumstance contributes materially to save a good many lives, particularly in cases of accidents.

There is, on the other hand, a circumstance which tends to make the mortality in the merchant marine seem much lower than it really is, and to elude accurate statistics on this point. A merchant seaman who falls seriously ill at sea is put on shore as soon as an opportunity offers, being left behind at some hospital often to die; and at any rate he is thus lost sight of. In this manner certainly a large number of deaths in the mercantile marine escape registration.

Although, as we have seen, one cannot draw any conclusion regarding the health of the whole of the population afloat, from that of the navy, yet the Statistical Reports of the Health of the Navy are of considerable interest not only in themselves, but also with regard to our present subject. According to the latest one,[1] for the year 1874, the *death-rate* in the British navy was 9·4 per 1,000, the number of men estimated to be constantly serving during the year being 44,530, of whom 50·32 per cent. were between the ages of 15 and 25; 34·03 between 25 and 35; 12·53 between 35 and 45, and 3·11 per cent. above 45 years of age. The latest Report of the Health of the British Army for the year 1873 shows a death-rate of 12·26–8·28 per 1,000, for the troops serving in the United Kingdom, 16·25 per 1,000 for those at stations abroad. The death-rate in the navy, therefore appears to be more favourable than in the army. In explanation of this we must remember that at unhealthy foreign stations the mortality is, as a rule, much lower on board a man-of-war than amongst the troops on land.

Nowhere is the influence of hygienic improvements in lowering the death-rate more strikingly shown than in the navy and army. In the year 1779 the death-rate in the former was 123, in 1811 it had already declined to 31, in 1836 to 13, and in 1874, as we have seen, to 9·4 per 1,000 men of actual strength.

The rate of *morbility*, including injuries, was, in 1874, 1196·6 per 1,000; 39·18 per 1,000 were invalided. In the army only 1036 per 1,000—759·2 at home, 1314·7 at stations abroad—were admitted to hospital, and 37·3 per 1,000 were invalided—25·26 at home, 49·35 at foreign stations.

In the *Russian* navy the death-rate in 1860 was still as high as 19 per 1,000, whilst on the contrary the rate of admissions into hospital was, if the figures cited by Oesterlen in his "Medical Statistics" be correct, only 509 per 1,000, or less than half of that in the British navy as late as 1874. I shall not attempt to inquire into the cause of this astonishing discrepancy.

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[1] This was written in 1875.

Of special interest for our present subject is the proportion *pulmonary consumption* bears to the total causes of mortality and morbility among the seafaring population. In 1874 phthisis caused but 4·1 per 1,000 of the total cases of admissions in the British navy, or something like 3·4 per 1,000 men of actual strength. Like the state of health in general, this compares very favourably with former periods; so in the years 1830–36 the rate of admissions for phthisis, including cases of hæmoptysis, was nearly as high again, viz. 7·2 in 1,000 men of actual strength; the death-rate from phthisis during the last-named period was 1·7 per 1,000 men. Among the English land-population the latter rate was in 1838–41 almost as high again as in the navy, viz. 3 in 1000. In the Russian navy as late as the year 1860, the rate of admissions for phthisis was about 9 in 1,000; that of deaths from this disease as high as nearly 6 in 1,000 men.

It appears from these figures that phthisis was a far more fatal disease in the Russian than in the British navy. In the one the proportion of deaths to admissions from phthisis was as 25 to 100, in the other as 66 to 100.

In the British merchant marine nearly 3,000 deaths were registered from 1838–48. This small number, by the way, shows how extremely defective that registration of deaths must have been. For, taking the number of men then employed in the merchant marine at 172,000—in 1873 it had increased to 202,239—this would give an annual death-rate of only 1·7 in 1,000. In 1836 the death-rate in the navy, the health of which was always considered to be far better than that of the merchant marine, was, as we have seen, 13 in 1,000. The proportion of deaths from phthisis to the total of 3,000 deaths in the merchant marine was 40 in 1,000, whilst among the land population in England in 1838–41 that rate was 172, and as late as 1859 was 113·8 in every 1,000 deaths from all causes.

Here I may remark that, at least on the Continent, where there is not yet anything like such a national registration of deaths and their causes as in the United Kingdom, the mortality from phthisis is commonly rated far too high, being, in the absence of general statistics, calculated from hospital reports and the like. Thus it happens that phthisis is supposed to be the cause of death in from every seventh up to even every third case. I believe this erroneous estimate to be principally due to the fact that a most important class of deaths—those in infancy and childhood, up to the fifth year of life—rarely comes under observation in general hospital practice; whilst, on the other hand, that class of the community in which consumption reaps her richest harvest, viz., the lowest and poorest class, is there in a large majority.

Now, the proportion of the mortality from phthisis in the merchant marine to that among the land population will be still more strikingly in favour of the former, if we follow the correct plan, and only take into consideration the period of age that corresponds to that of active sea-service, instead of taking the total land population. First, however, I have to state that the mortality from phthisis among the English land-population has been decreasing pretty steadily and even considerably from the time at which those statistics were taken down to the year 1859. Thus, as we have seen, the rate in 1838–41 was 172 in every 1,000 deaths from all causes, in 1858–59 it was only 113·7, *i.e.* a decrease by about 66 per cent. But even when we take this later and far more favourable rate and compare the mortality from phthisis at corresponding ages in the merchant marine and the land-population in England, say the period from the fifteenth up to the forty-fifth year of life, we get a proportion of 40 deaths from consumption in every 1,000 from all causes among merchant seamen in 1838–48, to 418·4 among the land-population, *i.e.*, the proportion is more than ten times greater on land than at sea, and if we take the death-rate at similar ages it is about sixteen times as great. In fact, whilst at sea I have never myself seen a single case of phthisis in a merchant seaman, although I have been in medical charge, on and off, of over 120 of them.

Without, therefore, ascribing to sea-life any specific immunity from phthisis, yet I think it has an unmistakable *influence in preventing consumption.* How far its healing powers in this direction go will be shown later on.

Very different results have been arrived at by M. Rochard, who believes that sea life, particularly within the tropics, is peculiarly apt to produce phthisis, much more so than is the case with land life in our climates. To these assertions, however, M. Garnier strongly objects, on the ground that at the seaman's hospitals at Toulon, Brest, Cherbourg, Lorienhand, Rochefort, during a number of years only 9·4 per cent. of the deaths were from phthisis, while at the same time the proportion among the general population of those places was over 20 per cent.

(2.) *The Health of Emigrants and Private Passengers on long Sea-voyages.*—According to official statistics, in the course of about five years, up to September 30th 1875, 61,312 emigrants were sent from Great Britain to New Zealand. Of these 43,406 were adults, 15,287 children from one to twelve years of age, and 2,629 infants under twelve months. Of the adults 150 died during the passage, *i.e.*, 3·5 in 1,000 which would give an annual death-rate of about 14·0 in 1,000. Considering that emigrants are mostly in the prime of life and in good health when setting out for a new world, this death-rate appears a rather high one; and that of the children and infants is still higher. Of the former, 1,094, *i.e.*, nearly 72 in 1,000, died during the voyage, which lasted about three months, so that the annual death-rate thus amounted to about 285 in 1,000; of the infants 502, or 191 in 1,000 died during the passage, being equal to an annual mortality of 164 in 1,000!

These statistics, which chiefly relate to excellent new ships under special government superintendence, speak volumes against the crowding together of emigrants, and in favour of the urgent necessity of further sanitary and particularly dietetic improvements.

It would not be difficult to get statistics also of the *morbility* in emigrant ships, their medical superintendents, being not only, as a rule, qualified practitioners, but being also under direct government control. I very much doubt, however, whether any such statistics have yet been collected. Certainly there are none whatever on the health of *private passengers* on long sea-voyages. I am therefore, in this respect, as in most others throughout these papers, confined to my own observations, which for statistical purposes are necessarily by no means sufficiently extensive to allow general conclusions to be drawn from them. They relate moreover to a private passenger sailing ship of the very best class, but with a rather abnormal class of passengers, the latter being, at least on the voyage to Australia, mostly invalids. My voyage to South America I leave out of consideration at present, because I should not reckon a sea-voyage among the long ones which all in all, there and back, was only something over three months and a half duration, and in which the periods of uninterrupted sea-life lasted only from a fortnight to three weeks at the most.

On my last voyage, then, round the world, the mortality was equal to 30·8 per 1,000, which as all the four deaths occurred during the voyage to Australia, and none on the homeward voyage, would amount to a yearly death-rate of about 138·6 per 1,000 for that first part of the voyage. Of those four deaths three were from consumption. The only case of death that occurred among the crew was that of a midshipman, who was drowned by falling overboard during a strong gale. Thus no death from disease contracted on board occurred during the whole of that long voyage.

As regards the morbility in my last ship, about 80 per cent. of the total number of persons she carried came under medical care. These numbers, however, do not represent the rate of morbility, which was very much much higher, a large majority of the 80 per cent. of persons coming more than once under medical treatment for different diseases.

*Affections of the Respiratory Organs*, together with *common colds*, I have reserved until now, because their frequency or non-frequency bear pretty directly upon the principal subject of this chapter, viz., the question of the value of sea-voyages in the treatment of consumption. I have somewhere read the remarkable statement that at sea one does not catch cold, and that it is only on coming ashore after a long sea-voyage that sailors and passengers are liable to it. Now my experience shows that so far from primary cases of catarrhal affections of the respiratory organs on a long sea-voyage being absent, they take on the contrary the third place in frequency in my pathological list (see Part iv.), disorders of the digestive system occupying the first, and those of the skin the second place. And this is the case, even if we exclude cases where pulmonary disease was present at the commencement of the voyage, and where a peculiar liability to respiratory affections therefore existed. The "common cold" showed a remarkable preference for seamen; acute bronchitis for children, acute catarrh of the larynx was observed exclusively among the former. It is also a remarkable fact that scarcely any *chronic* affections of the respiratory organs amongst the seamen came under my notice.

To sum up my experience on the state of health on long sea-voyages, I cannot but say that the *morbility* appears a *remarkably high one.* From this one might be inclined to conclude that little is to be expected from long sea-voyages as a cure for consumption. The same objection has also been made with regard to those thermo-climatic resorts where the prevalence of phthisis and zymotic diseases, including infantile diarrhœa, indicates the hygienic condition of the place to be more or less unsatisfactory. But one cannot draw from the mortality and the morbility of a native population rigid conclusions as to effect, favourable or otherwise, which a temporary residence at that place for a curative purpose will have on the invalid. The latter is expected to regulate his life strictly according to hygienic rules with regard to *régime*, food, dwelling-place, air, &c. Thus it is possible more or less to avoid the sanitary drawbacks, and at the same time to get the full benefit of the climatic advantages of a place. For it is unsanitary conditions, and not the warm climate, as some have asserted, which produces phthisis and other diseases prevalent among the native population. The climate, it is true, in consequence of its high temperature is apt to give that disease a more infectious and septic character, which also manifests itself in a good many other diseases in warm climates.

At sea it is much more difficult to avoid sanitary drawbacks in the way indicated than at a climatic resort on land.

It is not, however, in regard to hygiene alone that an invalid or a new comer is in general more favourably circumstanced than native residents. He has also a climatic advantage; for besides the direct benefit he may derive by the change of climate, he possesses a certain immunity from the diseases to which the inhabitants are liable. Thus it has been found that a person coming from high into low tropical latitudes, where catarrhal affections of the respiratory organs, for instance, are very prevalent, is much less subject to them than the natives. In speaking of the European residents in the French colony of Senegambia, Dutroulan says :—" Les phlegmasies aiguës des bronches sont excessivement rares, malgré une météorologie dont les écarts et les exagérations dépassent tout ce qu'on rencontre dans nos autres colonies." In British Gambia the morbility and mortality from diseases of the respiratory system among the colonial troops, exclusively natives of Africa, there being no European troops there, are far higher than at any place, either at home or abroad, where British troops are stationed. Dutroulan's remark is also confirmed by a comparison of the rate of morbility from those diseases, as shown by official statistics among the European and colonial troops at stations where both live together. With only one exception—Ceylon, where the proportion is reversed—the rate is considerably lower among the European than the colonial troops.

Quite the contrary relation appears to obtain in regard to the morbility and mortality from zymotic diseases of natives and new comers respectively. New comers, as is well known, are most liable to be attacked by yellow fever, malaria, dysentery, &c., at places where those diseases are endemic, whilst the natives with a little sanitary precaution, keep comparatively free from them. In the same way the enteric fever of Munich is most dangerous to new comers.

3. *On the Value of Sea-voyages in the Treatment of Consumption.*

The physical (chap. i.), physiological and therapeutical (chap. v.) characters of sea-climates; the hygiene (chap. ii.), the physiology and pathology of sea-life (chap. iv.), its mortality and morbility statistics (chap. v. 1 and 2) having been given, we have now, I think, got a pretty broad basis from which to approach the question of the value of sea-voyages in the treatment of consumption.

The first and most important point, then, we have to examine is the *therapeutical character of long sea-voyages*, particularly as compared with the action of the sea-climate at one and the same place, on *terra firma*. It is a common belief, at least among the non-professional public, that their principal therapeutical value lies as much in the invalid avoiding the winter of the northern hemisphere and enjoying an equable warm climate, as in his being in the constant enjoyment of pure sea-air. With regard to the first supposition, the invalid is sure to be deceived, and the same will more or less be the case also with regard to the second one, inasmuch as he not only has to breathe the stuffy air of a small cabin at night, but may also be confined to it during the daytime in case he is not strong enough to face every sort of weather in the open air, or is altogether laid up.

As has been shown in the first chapter, the climatic changes on a long sea-voyage, in particular that to Australia, are very great indeed, greater than any observed in our climate, at least within so short a time. It takes only a few weeks to pass from the prostrating heat of the tropics to the freezing cold and chilling gales of the southern oceans, where the appearance of icebergs may at any time complete the impression of veritable winter, and *vice versâ*. Thus it is clear that to expect equability of climate and perpetual summer on such a voyage is an illusion which may prove fatal to an invalid. It cannot, therefore, be to those circumstances that the beneficial action of a sea- voyage as a therapeutical agent is due. It is, on the contrary, the *great diversity and rapid change of climate that constitute the therapeutical character of sea-voyages* by acting as a potent *stimulus* to the whole system, as well as *hardening* the invalid's constitution against every sort of climatic vicissitudes.

This, in my opinion, is the principal point to be considered by a medical adviser in weighing the *pros* and *cons* of this remedy.

Of what avail is the pure sea air outside to an invalid who dares not face it, being obliged to retire into the close atmosphere of his cabin before any of those climatic vicissitudes so frequent and varied on a long sea-voyage, heat or cold, a sudden change of the weather, a long-continued rain, a strong gale, rough sea, &c., or if he is altogether confined to his bed by a fresh cold he has caught by exposing himself to one of them? The first and principal condition, therefore, for sending a patient to sea for his health is *that he have strength enough left* to face those climatic vicissitudes; that his power of resistance have not, by long and severe disease, or by the manner he has hitherto been nursed, been reduced to such a degree as to render him too tender and weakly to struggle successfully against them. Much, however, can be done in the way of a rational systematic *régime,* at sea as well as on land, towards making even a very weak constitution more fit for this struggle.

I had a regular system of gradually preparing for it the invalids under my care at sea. Some of them had until then been under the care of fidgety mothers or aunts, and at first their beliefs were utterly hostile to my system, and they preferred to shut themselves up against the open enemy of a cold wind, thereby falling into the hands of a more insidious foe, a stuffy polluted air. I must say that I found them more docile and reasonable on this point, than in regard to their general mode of life, which only too often was contrary to the principles of a rational *régime.*

If in this way an invalid gets to stand every sort of climate and weather in the open sea-air, as well as sudden changes from one to the other, his constitution will be not only directly benefited, but he is likely also to become hardy enough to stand thereafter the vicissitudes of his native climate.

After what has been said, I need not further detail the indications for sending consumptive patients to sea for their health; they will moreover result, by way of exclusion, from an enumeration of the principal contra-indications.

I should like to correct here a current opinion that the quiet of sea-life is a great reason for sending patients to sea for their health. I can only say that to one not yet initiated into sea-life, this will not prove a particularly idyllic task, nor one to be accomplished in a short time; he will find a good deal to excite himself about, if he have not a perfect mastery over himself in the sense of the great Horatian principle *nil admirari.* In fact, it is much more easy to find quiet on *terra firma* than at sea. The very difference of the two elements speaks for it.

I do not, however, mention this as being a disadvantage of sea-life; on the contrary, I consider it far better for one who wants rest from overwork, business-worry, trouble, and anxiety of any kind, to have his thoughts directed into other channels, than to be left to his former mental occupations, which have already engaged him so long and so closely as to break down his health.

The principal *contra-indications* to sending a consumptive patient on a sea-voyage for his health are:—

1. *Extreme debility,* particularly if combined with an *advanced condition of the local disease.* It is a great risk and, therefore, it may be downright cruel to send such patients away as a last resort, the probability being that their sufferings in more than one way will be increased and death accelerated. Before taking that step I should thoroughly recommend a cautious trial of the home climatic treatment, as detailed in my paper, *Principles of the Climatic Treatment of Consumption.* This can be carefully watched and at any time discontinued. If the season be too rough or the patient too weak, then let him die quietly at home.

2. A patient should not be sent to sea who is not quite free from *fever,* or those hectic rises of the evening temperature indicating an active progress of the disease, constitutional and local. There is great risk of the fever increasing, and from an intermittent becoming a remittent or continued one, as the temperature of the air rises to tropical heat. One of my patients died in this way even before the line was reached. In the case of another who died later on, such an increase of the fever could be traced from the time of entering the tropics. Generally speaking, any urgent or active symptoms ought to be removed before sending a patient to sea.

3. A pronounced *disposition to* hæmorrhage, in particular hæmoptysis, forms another contra-indication. This is not so much in view of sea-sickness—for much as I have seen of the latter both in healthy people and invalids, I never have met with a case of hæmorrhage caused by it—as in view of the hot, sultry weather of the tropics, which, as we have seen in the fourth chapter, may cause a regular epidemic of hæmorrhage. This warning I would address particularly to invalids of more advanced age, whose blood-vessels, often up to the very largest ones, are more or less in a state of sclerotic degeneration. In the two most serious cases of hæmoptysis that came under my notice at sea, the one person who died was nearly fifty, the other over thirty years of age. In particular, careful examination of the condition of the

arteries and the heart should therefore be made before sending a patient of somewhat advanced age to sea.

4. A difficult point to prognosticate is the disposition of an invalid *to sea-sickness*, if this has not been already proved by a previous voyage of some length. A short trip like that across the Channel decides nothing even if the person has been violently sea-sick. I do not know how one could foretell with anything like precision whether that state of misery would last for a short or long time were the voyage to last some weeks or months. I may be allowed to repeat here Mr. Darwin's words: "If a person suffer much from sea-sickness, let him weigh it heavily in the balance. I speak from experience: it is no trifling evil, cured in a week." Invalids, however, as has been remarked in the chapter on sea-sickness, do not, on the whole, suffer much from it.

5. A similar difficulty to that of prognosticating the degree and duration of sea-sickness an invalid will have to undergo exists as to how sea-life will agree with his digestion. A weak stomach certainly is no recommendation for a long sea-voyage. I have, however, seen a stomach, previously very weak and dainty, after sea-sickness was over, master food which it could not have done at home. Cookery on board English vessels is plain, not to say coarse, or if there be any aspirations after something higher, it falls more or less short of the "fine arts." At any rate, most of those "nice little things," as a friend of mine longing for them endearingly used to call them, and which are equally dear to the gourmand and to the invalid, are not to be got at sea.

It now only remains for me to give an account of my experience on the effect sea-life had on the consumptive invalids that, twenty-six in number, were under my observation during my last voyage round the world.

After the longer or shorter time—on an average we may say a fortnight—it takes to get over sea-sickness and the period of acclimatisation to sea-life, the passengers, healthy and consumptive, appear to be reviving in body as well as in mind. This change to the better is the more striking the more a person has been down in either respect, either at embarking or only in consequence of the miseries of sea-sickness. The sallow, pale and sunken-in face is after some weeks fresher and fuller-looking; the hectic expression of the whole frame and habit gives place to a more healthy, elastic, and vigorous one. The animal spirits too revive; a feeling of buoyancy and delight takes the place of the former dejection. Life is felt to be a pleasure instead of a burden. Even the termagant temper not unfrequently met with among our class of invalids cannot resist the charms and the enlivening effects of the perfect climate, within the trade-wind, before which by that time the ship will be flying southward.

But soon the heat becomes trying to the strong as well as to the weak. The effects of the tropical climate, in particular of the calm weather, on the general condition—prostration—on the digestive system—indigestion—and the circulatory system—congestions, hæmorrhages—have been fully described in the fourth chapter. I was told by several of my consumptive patients on board that they seriously thought of dying under that climatic trial. One gentleman in fact died while still on this side of the equator. In the two other cases of consumption that ended fatally on the outward voyage their getting worse distinctly dated from the beginning of the hot tropical weather. One man very nearly died during it from a series of the most profuse hæmoptoic attacks attacks I have ever seen. Life in fact seemed to be extinct, when he received new blood and with it new life by a direct transfusion of blood from the carotid of a lamb into a vein of his forearm.

I will not, however, dwell any longer on incidents of the voyage, but continue to follow the general effect of the voyage on the constitution of our consumptive passenger. Supposing then he has not been thrown back by some climatic influence he was too weak to withstand, or to which he exposed himself without the necessary caution, by an anti-hygienic mode of life to which invalids as soon as they are a little better are easily tempted, or by the strongly progressive tendency of his disease—in short, supposing things to stand as favourably as can well be expected, yet the constitutional improvement is checked after a certain time, the state of our invalid's constitution remains now stationary for a certain period and then a retrogressive tendency is observed to set in. The individuals themselves are, as a rule, well aware of those different stages—*the progressive, the stationary*, and *the retrogressive.* They are, moreover, written on their very countenances.

This is a point well to be noticed, and one quite contrary to the notion one frequently meets with, viz., that the longer a sea-voyage the more efficacious it must be. The same rule, however, applies to this as to other therapeutical agents. The same changes may be observed in patients sent to some climatic resort on land; the same in the action of drugs. For instance, a certain drug may have a most striking effect at first in some disorder of the stomach or of the bowels; but after a certain time there comes a check, and still further on the ground gained may gradually be lost again. Another remedy is resorted to which, although it may act on the same principle, yet seems to take quite a fresh effect. Another instance is that of cod-liver oil, which often proves of great benefit for a certain time, when it is refused, the organism being as it were saturated with it.

*Change* is the great thing for keeping the organism in good and vigorous condition and for restoring health to the sick. It is therefore not only to their particular therapeutical character, as above defined, that sea-voyages owe their value as a remedy for consumption, but also to the thorough change in climatic, hygienic, and social respects which a long sea-voyage, say to the antipodes, involves. For this reason also the very change from sea to land life has a similar beneficial effect.

In this case the reviving and refreshing effect on the healthy as well as the sick body makes itself felt even more quickly, as one has not first to get over the lowering effect of sea-sickness. The popular belief of the beneficial action of a sea-voyage in some cases "coming out" only after it is over is, therefore, not without foundation. I should thus interpret it: that whilst the change from land to sea had little apparent effect at the time, this becomes evident when it is doubled, as it were, by the reverse change.

To return to the different *changes in the action of sea-voyages on the constitution*, one will ask after what time the acme of this therapeutical action at the end of the first progressive stage is reached, *how long*, consequently, *a therapeutical sea-voyage is to last.* The answer, of course, cannot be given in precise figures, as these, necessarily, vary considerably, not only according to the individual case, but also to external physical circumstances. I should, however, as an average, fix the time it is desirable such a voyage should last at about two months. Beyond this period, generally, no further benefit appears to be derived from uninterrupted sea-life by an invalid, and when it lasts much longer—three and as long as four months, as I myself have seen it—a retrograde effect obtains even with healthy people.

I am sorry space does not permit here to reproduce a table specifying sex, age, origin, and character of the disease, stage of the pulmonary affection, effects of the voyage on the local and general disease in each of my twenty-six cases, and further illustrating them in the column "remarks." I therefore must confine myself to the following summary: four of my cases were females, the rest males. Their ages were between 5 years—a boy born in Australia with strong hereditary disposition—and 49 years; the average age was about 26½ years. Eleven cases were of catarrhal, fifteen of tubercular origin,—terms which will be fully explained in a separate paper—"Principles of the Climatic Treatment of Consumption," and of the latter with marked hereditary disposition.

As regards the stages of the local disease, as I found them at the first examination, I have to premise my definition of them. By the first stage—*phthisis incipiens*—I understand dulness confined to the apex of the lung; by the second, dulness reaching downwards over the second rib in the front, or the spine of the scapula at the back, or both of them at the same time. The third change is characterised by signs of excavation besides those of infiltration or induration. I have found those definitions the most congruent to clinical experience. Of my twenty-six cases, then, in nine the affection was in the first stage; seven of them were unilateral, two bilateral. Bilateral affection of the first stage on the one, of the second on the other side, was represented in four cases, and in the same number also bilateral affection of the first stage on the one, of the third on the other side. There were two cases of unilateral, one of bilateral affection of the second stage; three cases of bilateral affection of the second stage on the one, of the third on the other side. Lastly, there was only one case—of catarrhal origin—of unilateral affection of the third stage, two of bilateral affection of the same.

The results of the sea-voyage were (1) on the constitution: fourteen cases got better; four worse; two died; in five there was no material change one way or other, to be noticed. (2) on the local disease; in five cases it got better; in six it remained stationary; in two better on the one side, worse on the other; in thirteen cases it got worse.

The only statistics besides these of results of sea-voyages, in the treatment of consumption which have come under my knowledge, are those collected by Dr. Theodore Williams. From the following extracts from an extensive table of his, it will be seen that the results obtained by Drs. Williams, father and son, compare most favourably, not only with those obtained at even the most famous climatic health-resorts, on *terra firma*, on the Mediterranean basin, and above all others in Egypt, but also with the results I have just given.[1] With the latter they seem to be so much at variance as to require some comment. First of all, these eighteen sea-voyage cases were *selected* for this plan of treatment by men of the highest authority in this branch of pathology, whilst of the totality of my own cases I got the impression that they had been sent to sea *at random*. Dr. H. Weber also, as he kindly informs me, has seen good results in the cases he *selected* for this kind of climatic treatment. 2. Those statistics are based on too small a number of cases, even smaller than my own (eighteen against twenty-six cases). Neither of them can be considered large enough to draw general conclusions from. 3. A large majority of Drs. Williams's cases—72·22 per cent.—were of the first stage only, a circumstance which testifies to the humane cautiousness of the medical advisers. 4. Whilst

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[1]

| | Results. | | | Number of patients. | Number of sea-voyages or winters. |
|---|---|---|---|---|---|
| | Improved. | Stationary. | Worse. | | |
| Sea-voyages . . . . . | 89 % | 5·5 % | 5·5 % | 18 | 45 |
| At Stations on the Mediterranean Basin, including Egypt . . . . . . | 61 % | 21·8 % | 17·2 % | 172 | 255 |

of the 172 patients wintering at stations on the Mediterranean or in Egypt, each spent there on an average not quite 1·5 winters, the average for the invalid afloat has 2·5 voyages, mostly to Australia and back, which amounts to considerably more than even the same number of winters, such a voyage not only including our winter, but the greater part of the year.

By these remarks I do not intend to detract in any way from the value of sea-voyages as a therapeutical agent, nor from their superiority in this respect over the thermo-climatic treatment on *terra firma*, as shown by Dr. Williams's statistics. Their superiority is the more remarkable as the climatic treatment on *terra firma* has several important advantages over that on board ship, particularly in hygienic and dietetic respects.

A ship cannot be so well ventilated as a house; so during the night-time at least the invalid will enjoy, on the whole, a purer air on land than sea. During the day also, he can have as much fresh air on land as at sea, and, if he is at the sea-side, where most of the thermo-climatic health-resorts are situated, of sea-air too. On *terra firma* one always, at least in the south, has those fresh provisions, especially vegetables, which one is either entirely deprived of at sea, or can only get in the shape of preserves. Here also the daily life and exercise can be diversified as much as is desirable. On the other hand he may have a more quiet and retired life, if he desires it, on *terra firma* than on board ship. On board ship one cannot help being in daily company with people one would fain avoid the sight of if he were on shore—no trifling point considering the irritability of temper common with consumptive invalids. A long sea-voyage cannot, like the thermo-climatic treatment on shore, be broken off whenever there is occasion for doing so. What is it then that nevertheless gives sea-voyages their therapeutical superiority? The explanation is to be found in the very difference of their therapeutical characters. Whilst the thermo-climatic treatment has only an alleviating symptomatic effect, as is shown more fully in my paper—"Principles of the Climatic Treatment of Consumption—" the effect of the thalasso-climatic treatment meets the *indicatio morbi* it is at the same time a strengthening and a hardening one.

Taken altogether sea-voyages are, and no doubt will be, more and more generally appreciated as *a most valuable agent in the treatment of consumption, if only the cases are judiciously selected and the invalids themselves keep a strict régime.*

An invalid who has an open eye and heart for things beyond his own pale, and who, in particular, is fond of the sea in its varied grandeur, will not fail to combine on a voyage to the Antipodes *utile cum dulce,* gaining health, new knowledge, and pleasure at the same time, and by leaving all trouble and care behind him and entering with heart and soul into the new condition of life, he will confute that other Horatian dictum—*Cœlum non animum mutant qui trans mare currunt.*

# ON THE SYSTEMATIC PREVENTION OF AFTER-PAINS.

BY W. ALLAN JAMIESON, M.D., F.R.C.P. EDIN.

After-pains constitute one of the most annoying of the sequelæ of labour. They are so common as to be regarded by many as physiological, and their occurrence is looked on by the laity certainly, and by a large proportion of the profession, in multiparæ at least, as a matter of course. If not altogether pooh-poohed, they are declared to be "safe things;" if very severe are treated by means of an opiate or hot poultice, or both, or after a day or two, during which time the mother's rest and comfort are sadly interfered with by the inevitable dose of castor oil. There have been of late, however, some symptoms of dissatisfaction with this state of things, inquiry into the causes which lead to their production have been more precise, and rules for their prevention have become more definite. They are regarded as irregular uterine contractions, having for their object the expulsion of coagula contained within the womb. Granted the necessary existence of clots free in the uterus, there can be no question of the necessity for their speedy expulsion. But why should clots form there at all? Let us for a moment inquire into the conditions of the inner surface of the uterus and its walls after the third stage has been concluded. We have a large space previously occupied by the placenta, and exhibiting the openings of many torn vessels, openings to be plugged shortly by coagula. But the mechanism by which hæmorrhage is prevented lies deeper. In the substance of the uterine walls at the site of the placenta are large venous sinuses as well as in the placenta itself; these have been shown by Professor Turner to be arranged in layers, and freely communicating by, as it were, a series of trap doors. These apertures are placed either alternately, or at least not opposite to each other, so that when the walls of the venous canals are approximated, each opening is roofed in and closed. This apposition of the walls is effected by the contraction of the uterus after delivery is completed, and, if absolute, would entirely prevent hæmorrhage. We do meet sometimes with cases perfectly physiological; scarcely a drop of blood follows the extrusion of the placenta and membranes, and the lochial discharge is so scanty as to be quite unimportant. I have seen several such; in them the layers of uterine sinuses have been firmly appressed without so much subsequent relaxation as to permit of any considerable bleeding into the uterine cavity. This is not the common course of events, however. The uterus may at first contract firmly, but soon again partially relaxes, permits a certain degree of filling of the sinuses, and, again contracting, squeezes the blood into the uterus. The blood coagulates, and these clots set up irritation by their presence, and lead to more energetic contractions to cause their expulsion.

The above seems to me to comprise the true history of after-pains, though other causes are named in the text-books; and the remedy is to bring about *at once on completion of the third stage* such an amount of tonic uterine contraction as to prevent any refilling, however partial, of the uterine veins.

When it was taught that twenty minutes were to be permitted to elapse after the birth of a child before any attempt at removal of the placenta was to be made, any endeavour to induce immediate tonic uterine contraction would have been, from the nature of things, fruitless. But since the method advocated by Crede of squeezing out the after-birth by external pressure, has been generally adopted, there can be no objection to the employment of any safe and efficient mode of keeping the womb firmly contracted. Much may be done in this way by firm pressure by means of the hand of the accoucheur himself, and I am aware that it is the practice of distinguished obstetricians to administer a dose of some preparation of ergot by the mouth towards the close of labour. But the hand tires, and when anæsthetics are given, swallowing is impossible. In the solution of ergotin, introduced by Professor A. Simpson, we possess an agent available in every case: it is at once perfectly reliable, keeps well, and requires no preparation, while, if injected deeply over the glutæus, nothing unpleasant results from its use, save in some cases slight pain for a short time. I have now employed it in the sixteen last cases of midwifery I have attended, with the happiest results as regards the prevention of after-pains. Some of these were primiparæ, however, in whom after-pains are frequently absent altogether or slight, but three at least were marked instances of its value.

Mrs. J., aged 35, had a natural though very tedious labour with her sixth child. The head presented at the brim in the third position of Naegele and rotated into the second in its course through the pelvis. Chloroform was administered during the last two hours. After the child had been expelled and before the cord had been tied, ten minims of Dr. Simpson's solution of ergotin,[1] were injected deep into the buttock. After removal of the child, the placenta was expelled by Crede's method, and the uterus caused once for all to contract firmly, so as thoroughly to expel all clots, then the binder without pads was applied. It was half an hour before Mrs. J. awoke to full consciousness, and she never had an after-pain to speak of, though in all her previous labours she had suffered for several days severely. During the hour or so I remained with her or in the house after the completion of the labour, I examined as to the state of the uterus and found it always hard and unyielding.

Mrs. L., aged 35, was also confined of her sixth child, after a rapid labour, in which the head presented in the first position. No anæsthetic was given, but the same course was pursued in the management of the third stage, as in Mrs. J.'s case. As in hers the after-pains had been most severe and long-continued in her previous confinement. On inquiring as to their occurrence or not on this occasion, on my visit next day, my patient assured me with a smiling countenance that she had not had anything worth calling a pain since the last labour pain itself; not even when suckling. This last fact is specially interesting, as even in those in whom after-pains at other times are slight, the act of nursing usually evokes them.

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[1] Ergotin, ʒss.; distilled water, ʒiss.; chloral hydrate, gr. v.

The third case was almost similar, save that it was an abortion at the fifth month; in it there was neither after-pain nor much lochial discharge. All the sixteen cases made quick and uninterrupted recoveries.

In using ergotin in this way, there is one point to be attended to, arising out of the mode of action of ergot on the uterus. Although ergotin injected subcutaneously produces the physiological effect of the drug in the most rapid manner at present attainable, still it must be remembered that ergot acts gradually, its full influence is not manifested all at once. When given during labour the contractions brought on become by degrees more and more powerful and tetanic. So when ergotin is injected at the close of the second stage it does not at once bring the empty uterus after the expulsion of the secundines into that state of firm permanent contraction necessary to prevent after-pains. This must be done by the hand of the accoucheur himself, in the act of, and after squeezing out the placenta. The effect of the ergotin is now coming into play, and once the uterus is firmly contracted it will maintain it so. What I wish to insist on is that it will not do merely to inject ergotin and trust *to its unaided action from the first.* We must be fully assured that the uterus is contracted before we leave it to nature and ergotin.

Should more extended observations bear out to the full the value of this use of ergotin, as I firmly believe they will, both post-partum hæmorrhage and after-pains ought to become, in the large majority of cases, events of the past. I believe that this treatment should be adopted in every case of labour. By its means, and whenever any lacerations occur, or even, when the second stage has been merely tedious, the conjoined use of vaginal injections of carbolic acid lotion, the puerperal condition loses much of discomfort and danger to the mother, while the anxiety of the medical attendant is lessened.

Of the value of carbolic acid injections I can speak with the greatest confidence, for I have used them in any case where there was cause for anxiety, with the result, that out of 630 consecutive labours which I have attended during the last seven years, not one patient has died within two months of her confinement.

# Reviews.

*Butter: its Analysis and Adulterations; Specially Treating of the Detection and Determination of Foreign Fats.* By OTTO HEHNER, F.C.S., Public Analyst for the Isle of Wight, and ARTHUR ANGELL, F.R.M.S, Public Analyst for the County of Southampton. Second Edition, entirely re-written, improved, and augmented. London: J. and A. Churchill, New Burlington Street. 1877.

THE confident manner in which analysts pronounce upon the percentage of foreign fats in adulterated butter is rather surprising, and while we readily admit that the process which chemists owe to the authors of this book is the best hitherto devised, it is difficult to agree with their statement that "Butter analysis has now been placed upon as sound a basis as any branch of food analysis, and the most difficult of problems is considered to be solved." Their method is as follows:—Pure dry fat is obtained by melting the butter and filtering the fat which floats upon the water, salt, curd, &c. The butterfat is then saponified, and the soap treated with acid to set free the fatty acids of the butterfat. These acids consist of two groups, one being volatile and soluble, and the other insoluble in hot water, and therefore separable by washing. The percentage of the latter, or insoluble acids contained in the dry fat is the object aimed at. The average is stated as 87·5, and the extremes 86·3 and 88·5 per cent. in the dry fat of pure butter, while all animal fats except butterfat furnish 95·5 per cent. of insoluble fatty acids. On the other hand cocoa-nut oil yields only 8·8 per cent. Normandy butter, of which however the authors doubted the genuineness, gave 89·6, and Mr. Jones tells the Society of Public Analysis that he sometimes gets 90 per cent. from "butters of known purity," while Wanklyn and Cooper found only 92 per cent. in a sample of genuine mutton dripping. Moreover, a butter low in insoluble acids admits of the addition of 15 per cent. of foreign fat without detection by this method.

A long disquisition upon the relative merits of washing upon a filter and in a flask, would, we fancy, have been omitted had the authors known of the method of flask-washing invented by Mr. Robson, and taught by him to the pupils in Dr. Corfield's laboratory at University College. A *résumé* of all that is known of the chemistry of butter in other respects completes this useful book, which deserves a place in the library of every analyst.

*A Handbook of Hygiene and Sanitary Science.* By GEORGE WILSON, M.A., M.D. and C.M., (Edin.), F.C.S., Medical Officer of Health for the Mid-Warwickshire Sanitary District, formerly Medical Officer of H.M. Convict Prison, Portsmouth. Third Edition. Greatly enlarged, and in many parts re-written. Pp. 490. London: J. and A. Churchill, New Burlington Street. 1877.

THIS most readable handbook deserves its popularity for more reasons than its convenient size and pleasant style. It has supplied a distinct want by affording a sufficiently full and practical outline of hygiene, most grateful to those lacking the leisure to disinter the knowledge they require from original sources, or the skill to discriminate important facts amidst a mass of trivial or conflicting evidence. In this new edition the experience of the author has dictated many improvements which the progress of sanitation and alterations in law during the last four years have necessitated—both additions and alterations. A chapter on Water Analysis has been added which contains in half-a-dozen pages the gist of Wanklyn's book, very clearly put. The chapter on Vital Statistics is so enlarged and improved that it is now one of the most valuable in the work. The chapter on the duties of Medical Officers of Health has also been re-written to accord with the Public Health Act, 1875, and a number of official memoranda supplied by Dr. Buchanan, of the Local Government Board, replace the excerpt of the Sanitary Acts which appeared in the previous editions. We have no hesitation in pronouncing this the best text-book on Sanitary Science for medical practitioners and students; and even for those consulting original papers it is an excellent guide and synopsis.

# Clinic of the Month.

**Large Hydatid Cyst of the Liver Cured by a Single Aspiration.**—Dr. Bradbury of Cambridge records the case of a man æt. 42, to whom he was called by Mr. Parkinson, and who was exceedingly ill, suffering from enlargement of the liver. He had had pain at intervals in the abdomen along the region of the transverse colon for six months: but this had some time previously suddenly disappeared. Nine weeks before being seen he had caught cold and had headache and shivering; soon after his body swelled; he became very weak, the pain increased, and he had slight jaundice with œdema of the legs. A tense swelling occupied the epigastric and right hypochondriac region. There was fluctuation but no redness, and but little tenderness; percussion dulness extended from the right nipple to the level of the umbilicus in a vertical line, and over this dull region there was bronchial cough and ægophony. The spleen was not enlarged. The temperature was 99°·2 Fahr. At Dr. Bradbury's suggestion the patient was tapped by Prof. Humphry with the needle of an aspirator; a large needle was used and eight-and-a-half pints of pus were withdrawn. The pus contained hooklets and shreds of hydatid membrane. The patient made a good recovery without relapse. (*British Med. Journal*, Sept. 1, 1877.)

**The Treatment of Small-pox by Salicylic Acid.**—Dr. Engledue Prideaux late resident medical officer, Derby Small-pox Hospital, observes that the great object in small-pox is to modify the disease as much as possible, and to arrest it in its second and third stages, so as to prevent that destruction of tissue and subsequent cicatrisation which are so liable to follow and to produce deformity. The more intense the disease, the greater and the more universal is the eruption (except where it kills on the first onset), and as an accompaniment, the higher the temperature. Now the exceeding high temperature denotes excessive action on the part of certain of the tissues, an excessive tissue-change, which may be regarded as inflammatory in character. Regarding the disease as of germ origin, or caused by a morbific ferment, we have, first, an introduction of the germs, and then their propagation with exceeding rapidity. As the disease progresses, the poison is eliminated from the tissues by the skin and mucous membranes, producing the eruption and forming foci of inflammation local in character, which may be termed a dermatitis, and which may go on to the formation of pus and destruction of tissue, always found in the severer forms of the disease.—Regarding these germs, or minute bioplasmic particles, as low forms of life, Dr. Prideaux thinks that if we are able to introduce into the blood and tissues something that is fatal to their activity, we shall necessarily mitigate a disease depending in great measure upon that activity; it is necessary, then, that we should use a drug that will be absorbed into the blood without undergoing material change, and of which we may use considerable quantities without ill effect. In salicylic acid we have a drug that fulfils all the required indications; it is a powerful antiseptic, and is very fatal to all the lowest forms of life; it passes into the blood materially unchanged, probably in the form of the neutral salts of soda and potash, and appears in the urine in the form of salycyluric acid, where it may be detected by the addition of a few drops of tinct. ferri perchloridi, which produces a characteristic violet colour. When pure it may be given in large doses, as much as half-an-ounce in twenty-four hours: when given in these large doses it is apt to produce a marked depression, but this Dr. Prideaux finds is obviated by giving small doses of carbonate of ammonia. The best mode of administration is in solution with carbonate of ammonia and bicarbonate of soda in the proportion of five grains of each of these to twenty grains of the acid. This mixture is most pleasant to the taste and perfectly unirritating to the intestinal canal, and in some sixty or seventy cases he has never known it produce sickness.—At the Small-pox Hospital, Derby, he has lately treated twenty cases of small-pox with salicylic acid, all of which recovered, and all with the most marked results, both as to the progress of the disease and the subsequent pitting. This latter, has indeed not occurred, the disease under this treatment being arrested in the third stage, so that little or no suppuration is produced; the temperature is brought rapidly down and kept down, so that no secondary fever occurs. Of these cases, four were unvaccinated, eight cases were confluent, and one hæmorrhagic or malignant. He has been informed of cases in private practice where good results have taken place under the same treatment. He found a mixture of glycerine, gelatine, carbolic acid, and water very useful in painting the surface of the body; it quite prevents the odour of the disease, and entirely alleviates the troublesome itching, so much so that patients ask to have it by the bed-side so that they may paint themselves frequently. After a few days, and during the convalescent stage, he found that the citrate of iron and ammonia is a very useful adjunct to the salicylic-acid mixture, with which it is quite compatible, and forms an agreeable mixture. Whilst desquamation is going on, a daily hot bath, containing some two pounds of washing soda, aids the process very much. (*Ibid.*)

**Why Dental Caries is so general and How to Prevent It.**—Mr. Alexander Stewart, in a paper read at the Manchester meeting of the Medical Association, maintained the view now generally adopted by dental authors, that dental caries is due to chemical action—the destruction of this calcareous enamel by acidity. The chief sources of acidity in the mouth were enumerated and their action on the teeth illustrated by cases from practice. Food remaining on and between the teeth was stated to be by far the most common source of acidity and the one to which must be ascribed the general prevalence of dental caries, acid being formed wherever there is a lodgment of food long before morning, when only it is the custom to clean the teeth. Assuming acidity to be the only proximate cause of dental caries, and its neutralisation the only preventive, the profession was urged to inculcate the habit of cleaning the teeth at night and rinsing the mouth afterwards with a solution of carbonate of soda in water, made agreeable by the addition of camphor, recommended because so inexpensive that it may be regularly used by all classes. The author expressed his firm conviction that, were these simple means in general use dental caries would be as rare as it is now common. (*British Med. Journ.* Sept. 1, 1877.)

**The Antiseptic Treatment of Wounds.**—Dr. Roussel, of Geneva, described, in the Surgical Section of the Medical Association at Manchester, a transparent box for healing wounds of the limbs, without dressing, in a warm and antiseptic atmosphere. The apparatus consisted of a box with a glass lid, a double bottom for hot water, a front with well-closed passages for a pulverisator, an injector, a thermometer, and a closed collector of the discharges from the wound. After operation the wounded part, or the stump, was laid in a hammock on the box which was closed, and hot water was poured into the double bottom. The pulverisator and irrigator were used once a day and the collector of fluids was removed. No other dressing was required. (*Ibid.*)

**Anhydrous Dressing of Wounds.**—Mr. Hamilton, of Liverpool, in a paper read before the Surgical Section of the British Medical Association at Manchester, stated that he had used, with great advantage, in hospital practice, a mixture of equal parts of Friar's balsam and methylated spirit applied as a spray, in six cases of burn, four of lacerated wounds, and two of compound fracture. All the cases recovered, cicatrisation in the burns and compound fractures being more rapid than usual, while in the lacerated wounds, which were attended with much destruction of tissue, it seemed to be slower than usual. Mr. Hamilton has also employed, in the treatment of burns and scalds, powder of oxide of zinc, carbonate of magnesia, and powdered starch, as used by Dr. Smart, in his treatment of the sufferers from the explosion on board H.M.S. *Thunderer*, and had obtained generally satisfactory results. (*Ibid.*)

**The Treatment of Disease by Compressed Air.**—Compressed air has been used for some time in France and Germany to a limited extent, in the treatment of various diseases of the lungs, and also as a general means of giving strength to the system, but in consequence of the expensive apparatus required for its administration it has not had much vogue, except in large establishments. In the old system the patients were placed in a strong air-tight chamber, somewhat resembling a diving-bell, in which the air was kept at a pressure of from half to one, or at the utmost, two, atmospheres, and in which they remained for a definite time. At Reichenhall the "cure" consists of sittings of two hours each, taken once a day for a month. The sensations are stated to have been not very pleasant, owing to the unequal pressure in the tympanum, necessitating the frequent sipping of water. Since 1870, many German physicians make their patients, using this method simply inspire the compressed air from a reservoir by means of a tube, and a closely fitting mouthpiece. Rarefied air has also been used as well as compressed air. The general result of the inhalation of compressed air consists in the improvement of the nutrition, of the hæmopoietic functions, and of the external appearance owing to the increased amount of oxygen which is carried to the lungs at each respiration, and to the increase of *vital capacity* which the inhalation produces. This increase Dr. Biedert has found to be as much as from 500 to 700, or even 1,000 cubic centimetres, not limited merely to the time during which the inhalation lasts but continuing long afterwards. Whilst more air is introduced into the lungs by the employment of compressed air, more air is *withdrawn from it* than ordinarily occurs by the inhalation of rarefied air. Under either condition the stimulating or irritating property of the inspired air is followed by freer expectoration, and as a consequence neither method is applicable to any case of acute inflammatory mischief in the lungs. The diseases in which these modes of treatment have been found most efficacious are phthisis and a phthisical disposition, chronic bronchitis, emphysema, asthma, and compression of the lungs by pleuritic adhesions. It has been recommended by Waldenburg in stenosis of the larger air passages, and also in certain diseases of the heart, especially in affections of the mitral valve. Those cases of phthisis in which the irritating property of the inspired air makes itself most felt, especially those in which there is much fever, are the least suited to pneumatic treatment; cases also in which there are large areas of consolidation are unsuitable to it. Moderate hæmoptysis is no contra-indication to the use of compressed air. The compression varies from $\frac{1}{92}$ to $\frac{1}{45}$ atmosphere, the rarefaction from $\frac{1}{324}$ to $\frac{1}{68}$ atmosphere, and the number of respirations at each sitting ranges from 20 to 60. The sittings take place once, or at most twice a day. In the use of compressed air the patient should be directed, as soon as he has overcome the initial irritation, to inspire slowly and as deeply as possible without using force. On the other hand, when he breathes rarefied air he must inspire vigorously. In bronchitis this treatment renders expectoration more easy, stimulates the lung, and improves the circulation in it, and since the compressed air penetrates further into the lungs than any other local application, it is probable that it reaches diseased parts which would be inaccessible to any other direct treatment. The contra-indications to the use of *compressed* air, are degenerations of blood-vessels and an apoplectic tendency; and to that of *rarefied* air, especially in the form of inspiration, pulmonary hæmorrhages. The whole method is unsuited to active inflammation in the lungs, as well as to advanced bronchial dilatation. (*Med. Times and Gazette*, Sept. 1, 1877.)

**Treatment of Asthma Nervosum.**—Dr. Adolphe Wahltuch gives the report of a series of cases of nervous asthma in which he has effected a permanent cure by making the patient inhale arsenic in a finely divided form, and at the same time applying galvanization to the vagi. This plan of treatment is the following. At first he ordered a large dose of muriate of quinine (ten grains) to be taken every evening before the expected attack, which periodically reappeared at the same hour before bedtime. The result was a later outbreak of the attack, which awakened the patient after a few hours of sound sleep. He then ordered spray-inhalations of arsenic twice a day, and in gradually increasing doses, changing now and then the preparations. The following were used in succession: arseniate of soda (one-sixth to one-half grain); arseniate of potash (Fowler's solution, half a drachm to a drachm); arseniate of ammonia (one quarter to one-half grain). To the inhalation he at first added tincture of datura tatula, but soon had to leave it out, as it produced symptoms of narcotic poisoning. The arsenic inhalations were administered during the first two months twice a day; the third month once a day; the fourth month three times a week; the fifth month twice a week; and after the fifth month the inhalations were entirely discontinued. Considering the patients' disease to be of a nervous character, and believing the pneumogastric nerve to be the chief factor, he decided from the first to try also the effects of galvanisation. He selected the continuous current derived from Althaus's battery, with fifty small Smee's cells, of which he used at first five, and gradually and carefully increased to thirty cells. A wet sponge dipped in tepid salt water and connected with either of the electrodes was applied to the skin of the neck, that connected with the positive pole he put to the submaxillary fossa, along the inner edge of the sterno-cleido-mastoid muscles, and the other sponge, connected with the negative pole, be placed close to the trachea and near the sterno-clavicular articulation. He galvanised each vagus separately from two to five minutes. Galvanisation was applied daily for six months. (*The British Medical Journal*, Sept. 15th, 1877.)

# Extracts from British and Foreign Journals.

**Treatment of Catarrhal Affections of the Respiratory Passages by Pulverised Carbolic Acid.**—Dr. Moritz in a communication made to the Medical Society of St. Petersburg, states that he employed pulverised carbolic acid in the spring of last year in the treatment of catarrhal affections, and that he was led to its use by observing that having had occasion to use carbolic acid spray extensively, he had himself escaped any catarrh. The strength he employs is two per cent. He tried it first on two children who were supposed to be suffering from the commencement of an attack of whooping-cough. In the course of a few days the slight catarrh disappeared. In several cases where children were suffering from scarlet fever, the cough, which was present at the outset, diminished, and the nights were rendered more calm. The application of the spray, however, was not well borne by two patients suffering from phthisis, one of whom had large cavities in his lungs. The author explains the beneficial action of carbolic acid by supposing that many cases of catarrh are of an infectious nature. (*Bulletin Général de Therapeutique*, 1877).

**Diphtheria.**—Dr. Dulles gives the following notes of Dr. Monti's opinions regarding the treatment of this disease:—There is a vast difference between the circumscribed and the diffused forms of diphtheria. The former is not very dangerous, it seems to be superficial, its membrane is easily removed; the latter is extremely dangerous, its action is deep, its membrane is tough, of disgusting odour, adherent, and leaves a bleeding place when removed. Its danger consists not only in the obstruction to respiration, but in the blood-poisoning. The treatment must be as follows:—When recent, with redness and swelling of fauces, use cold applications to the neck, and give pieces of ice to be held in the mouth and swallowed. Later, when the membrane is formed, use irrigations of water upon the parts. The main points to be attained by these are cleanliness and coolness, which are of the utmost importance. To the water may be added with great advantage two per cent. of chlorate of potassium, or one may use this prescription:—

℞ Sodii salicylatis, 4 grammes;
Aquæ fontis, 200 grammes;
Spts. vini rectificati, 1 gramme;

which should be injected against the walls of the fauces and pharynx every two or three hours. When the membrane is thick and very ill-looking, it should be removed with a piece of sponge held in the forceps or attached to a stick. The sponge may be moistened with water or tinct. iodini. Dr. Monti thinks very highly of the action of a remedy called *Ethylsantogensäureskalium,* which he uses as an irrigant in half per cent. solution in water. Cauterants he holds to be injurious, as they irritate the inflamed parts. General treatment must be most scrupulously carried out. He uses quinine, iron, and salicylate of soda. Quinine he uses at first in doses proportioned to the fever, varying also with the age of the child. The most careful and sustaining nourishment must be given to the little patient, —milk, soup, wine, and meat juice. He recommends as a beverage:—

℞ Potassii chloratis, 3·00;
Aquæ fontis, 200·00;
Syrupi, 25.00;
M.—Sig. Use as a drink.

(*Philadelphia Medical Times,* August 4, 1877.)

**Venous Pulse in Chloroform Narcosis.**—L. Noël calls attention to the fact that a venous pulse is observable in both the external and internal jugular veins in every case of chloroform narcosis. In some instances it commences with the first inhalations, but it is not usually well marked till anæsthesia is fully pronounced, and it becomes most marked just before the patient awakens from sleep; at this period the pulsations can occasionally be followed into the subclavian, and even into the facial veins. Each pulsation consists of a double vibration, the acme of the wave immediately preceding the radial pulse, and the greatest degree of flaccidity immediately following it. The pulsations are often very considerable, yet they can scarcely be felt with the finger. Central compression of the vein prevents the pulsation, but distal compression is without effect. The whole phenomenon lasts at its acme for from ten to fifteen minutes and then gradually subsides, disappearing altogether in the course of half-an-hour. Age and sex appear to have no influence on it. M. Noël endeavours to explain it on the ground that the right heart, and the two venæ cavæ become over-distended with blood towards the completion of narcosis. As is shown by the frequency of fainting at this stage, the right auricle cannot entirely empty its contents into the right ventricle, and there is consequently a certain amount of reflux. (*Bulletin de l'Acad. Roy. de Méd. de Belgique*, Bd. x., No. 8.)

**Quadrennial Report of the Emilia Hospital at Reggio.**—Azzio Caselli states in his report that 1,720 patients, including ophthalmic cases, were treated in four years with a mortality of 6·52 per cent. The first section treats of vesico-vaginal fistulæ. The history of several cases shows that even large fistulæ can be cured by systematic application of the actual cautery (in one case it was applied once a week). Another case, in which the edges were refreshed and brought together by suture, died from peritonitis. The fatal result was not however consequent on the operation, but on the bursting of a Graafian follicle into the peritoneal cavity. With the exception of this case all recovered, four being treated by means of the suture, and four with the actual cautery. In one case of right-sided calculous hydronephrosis, which died without being operated on from peritonitis, the left kidney was completely atrophied. Three cases, in which external urethrotomy was performed for fistulæ and strictures, did well. Ovariotomy was performed twice; one of the patients died from collapse and one from peritonitis. Considerable interest attaches to six cases of laparotomy, four of which were undertaken for occlusion of the bowels. In one case the occlusion was consequent on fibrinous peritoneal exudation; enterotomy was performed, an artificial anus established, and recovery took place. In the second case there was stenosis of the ilium, and death took place from some unknown cause, a *post-mortem* not being permitted. A third case occurred in a patient with double inguinal hernia, a loop of the intestine becoming included in a ring of omentum. The fourth case was an intussusception of the bowel which was set free by opening the abdomen, but the patient died from peritonitis. In the fifth and sixth cases the peritoneum was opened in order to extirpate completely neoplastic formations (enchondroma and sarcoma) of the spermatic cord, which had extended far into the pelvis. The results were successful in both cases. Three cases of amputation of the thigh are reported. Caselli approves of a patellar flap, and recommends the section of the femur to be made high up, and that the synovial membrane should be completely extirpated, maintaining that after the quadriceps has undergone retraction the patella comes into contact with the sawn surface of the femur, and the whole weight of the body can be readily supported on it. One of the patients was able to walk thirteen miles a day without discomfort. The tibia protruded after one amputation of the leg, and the separation of the projecting portion was effected by the application of nitric acid on small sponges. A case of cancer of the tongue was treated by Riccioli's method, the lower jaw being divided between the first and second incisors. A second case was treated by a modification of Regnoli's method, the tongue being drawn down through an opening made in the submaxillary triangle of one side. A remarkable case of large intra-meningeal hæmatoma deserves mention. The patient was a girl nine years of age, the tumour was seated on the vertex, and had commenced two years previously; the bones could be felt as thin plates at its sides; the skin was bluish and tense; fluctuation was perceptible throughout, but there was no bruit; the movements of respiration had no influence on it; the intelligence of the patient was quite naturally developed. *Post-mortem* examination showed that the tumour was in reality an enormously dilated superior longitudinal sinus. It extended inwards between the hemispheres to the corpus callosum. The torcular Herophili was enlarged to twice its natural size. The immediate cause of death was cerebral hæmorrhage. Caselli believes it was due to congenital obliteration of the two jugular veins, but he was not allowed to examine the neck. In a case of cancer of the thigh, the femoral artery was tied before extirpation with good results. In regard to the transfusion of blood, Caselli is a strong opponent of the plan of using defibrinated blood. He uses the venous blood of the sheep, which he injects directly into the cephalic vein of the patient. In an aneurism of the femoral artery in its middle third, in which digital compression had been tried without effect, a cure resulted from the adoption of a peculiar method, which consisted of the partial rotation or twisting of the tumour. Caselli remarked that when such twisting was performed to the extent of a quarter of a circle, the pulsation at once ceased. The twisting was effected by two wedges of wood covered with linen, and bandaged in opposite directions over the sac, whilst the limb was maintained in an immovable position for three days, when the aneurism was found to be filled with coagula. For the purification of wounds an alcoholic solution of carbolic acid, or a solution of the permanganate of potash, was employed. Erysipelas was observed in forty-seven cases. Altogether there were thirty-two amputations, four of the arm, three of the forearm, ten of the thigh, and fifteen of the leg; of these five died. There were ten excisions of joints, three of the shoulder-joint, one of the head of the femur, one Syme's operation, one Lisfranc, and one tarso-metatarsal, also Lisfranc. (*Centralblatt für die Chirurgie*, 1877, No. 29.)

**Researches on the Action of Butyl-Chloral.**—Windelschmidt, excited by the important practical consequences which have resulted from Liebreich's investigations on butyl-chloral, has submitted its anæsthetic properties to further examination, without paralysing the respiratory or cardiac movements. He corroborates Liebreich's statements in regard to the pharmaco-dynamic properties of butyl-chloral. It acts in small doses on rabbits as an hypnotic and in larger doses as an anæsthetic. The anæsthesia begins at the head and then extends over the whole body, till deep narcosis is produced. The frequency of respiration is increased when very small doses are given, but with slightly larger doses it is considerably diminished, and with still larger respiratory paralysis is induced. The frequency of the pulse remains unaltered with small doses, but with larger ones it becomes progressively slower, probably as a secondary consequence of the diminished frequency of the respiration. Small doses of one quarter of a grain, injected subcutaneously, increased the frequency both of the pulse and respiration, but especially of the respiration; with a little more than a grain the respiration sank rapidly, whilst the pulse remained unaltered. With a dose of about twelve grains the pulse sank to one-half and the respiratory movements to one quarter of their normal frequency. In regard to the nervous system, five grains produced an hypnotic action, twelve anæsthesia of the head, and fifteen complete narcosis. The temperature at first rose considerably, independently of the anæsthesia, and subsequently fell to a marked extent. (*Deutsche med. Wochenschrift*, No. 35, 1867.)

**Treatment of Ringworm of the Scalp by Croton Oil.**—Dr. de Lacharrière advises the employment of croton oil, mixed with an equal amount of lard. This preparation is to be rubbed repeatedly into the scalp until the hairs of the affected parts loosen and fall out, owing to the specific folliculitis produced by this substance. He states that he has obtained many cures in six or eight weeks in this manner, after the usual methods of epilation, mercurial applications, and the like have failed. (*Bullet. Générale de Thérapeutique and Bost. Med. Journ.*, June 14.)

**Subcutaneous Injection of Carbolic Acid for Phthisis and Tuberculosis.**—Schnitzler states that he has made experiments with the subcutaneous injection of carbolic acid, in upwards of one hundred cases of phthisis and tuberculosis. The strength of the solution was from one to two per cent. The results were diminution of the febrile symptoms, more tranquil breathing, lessening of the feeling of weight and uneasiness, and when the remedy had been employed for some time, diminution of the night sweating. The amount injected was one or two Pravaz-syringefuls every or every other day. (*Centralblatt für die Chirurgie*, No. 20, 1877.)

**On the Antiseptic Action of Eserine in Ophthalmic Therapeutics.**—M. de Wecker employs sulphate of eserine in solutions of one per cent., the dose repeated either every hour or half-hour, firstly, in patients having large ulcerated abscesses on the cornea, after having evacuated the pus from the anterior chamber and from the abscess itself by means of a large puncture. In such cases the sulphate of eserine appears in a remarkable manner to prevent the pus from reproducing itself. Secondly, in cases of ulcus serpens, after a Sämisch's incision, by using the eserine, M. de Wecker was enabled to reopen the incision during the following days, a great advantage in large ulcers. Thirdly, in cases of suppuration of the wound succeeding the extraction of a cataract, M. de Wecker reopens the wound and infuses the eserine. This use for eserine should be added to its action on mydriasis; the antiglaucomatous action of this drug has been insisted upon by Ad. Weber, and Laqueur, as well as its influence on the reduction of conjunctival secretion. (*Lyon Médicale*, 1877.)

**How to Prevent Hæmorrhage.**—Dr. Riedinger observes that the greatest disadvantage attached to the use of Esmarch's bandage is the profuse hæmorrhage following the removal of the elastic band. The hæmorrhage in profuseness depends upon the force of constriction and the length of time which it is allowed to remain. The amount of blood lost in many cases is often more than that following digital compression. Esmarch himself admits that there is considerable capillary hæmorrhage after the removal of his bandage, but thinks that it is easily stopped and of no long duration. The author mentions the names of many eminent surgeons who have seen the most profuse hæmorrhage after severe operations, particularly after amputations; the blood pouring out of the wounded surfaces as if from a sponge. Various surgeons of England, France, and Germany, are mentioned, all of whom have had unpleasant experiences with this secondary hæmorrhage. The author believes that hæmorrhage is caused through paralysis of the vaso-motor nerves; further that owing to the compression, the blood being forced entirely from the part operated upon, no coagulation takes place. Various means have been tried to check this hæmorrhage, but they have, as a rule, not been very successful, *e.g.*, cold applications, ice, ice-water; but the hæmorrhage persists, in spite of these applications, often fifteen minutes, and sometimes for from one-half to one hour. Esmarch recommends the ligation of every blood-vessel, veins as well as arteries. P. Bruns has tied as many as thirty-six vessels, and still had hæmorrhage. Bardeleben has tied all arteries mentioned in anatomy, and those vessels presenting themselves to the eye, arteries and veins, and still had considerable hæmorrhage. Dr. Riedinger has performed experiments on animals to see whether the sensibility of the nerves was entirely overcome by the constriction of bandage. The reaction upon applying electricity was quite apparent, and he was hence led to apply electricity to the nerves which supply the vessels of the part operated on; his results were quite satisfactory, so much so that he recommends the application of electricity before the removal of the bandage. He uses the induced current. The poles to terminate in sponges; one pole to be placed on the wounded part, the other electrode to be passed over the nerve or nerves which distribute branches in the bandaged part; he has thus succeeded in reducing the hæmorrhage to a great extent. (*Chicago Med. Journal, and Canada Med. and Surg. Journal*, June, 1877.)

**A New Method of Curing Rupture.**—Dr. G. Heaton describes the result of a method of treatment based upon experience derived from many hundreds of cases of hernia, including inguinal, femoral, and umbilical enteroceles and epiploceles, reducible and irreducible, and extending over a period of more than thirty years. His method may be briefly described as consisting of a mild irritation of those portions of fibrous tissue lying directly in contact with the exterior of the neck of the hernial sac, thickening and consolidating their substance and effecting a contraction of the openings. The irritant used in this operation is made by dissolving with the aid of gentle heat fourteen grains of the alcoholic solid extract of white oak bark in half an ounce of Thayer's fluid extract of the same drug. With an instrument somewhat resembling a hypodermic syringe, about ten minims of this preparation are slowly deposited in such a manner as to moisten all the fibrous tissues in contact with the neck of the sac, including the rings themselves. Very little pain attends or follows the operation. A light truss or firm bandage is immediately applied and ordered to be worn a longer or a shorter time, according to the severity of the case. During the first week after the operation, the patient is usually required to remain in bed. After that time he gradually gets about, and in many cases returns to his business at the end of a fortnight. In the slight cases all mechanical support is removed in six or eight weeks, and the patient is pronounced "cured." Owing to the anatomical peculiarities of femoral ruptures they are not as readily cured as the other varieties, but Dr. Heaton claims a sufficient percentage of successful results amply to compensate both patient and surgeon for the operation. Contrary to expectation the above procedure is more successful in umbilical herniæ than in any of the other kinds. The reasons given are the greater aggregation of fibrous fasciculi which encircle the umbilicus, and the complete closure of the opening. Previous to the injection for the cure of an umbilical hernia, the neck of the sac is to be separated from the edges of the aponeurotic opening by pretty forcible taxis, or, this failing, by a subcutaneous dissection. In actual practice about one-third of the cases require a repetition of the operation, and the worst ones may require several before a satisfactory result is obtained. The above method of treatment is not applicable to irreducible ruptures until the sac has been emptied of its contents. If this object cannot be accomplished by strong and repeated manipulations, Dr. Heaton opens the sac, separates the adhesions, and replaces the bowel. Should the contents be omental, and of large size, he applies a ligature and cuts off the protruding mass. When the patient has recovered from the effects of these procedures, which he is said invariably to do in periods varying from a few days to several months, the operation by injection is resorted to, if necessary. Twenty-nine successful cases are reported to illustrate this mode of treating irreducible hernia. No fatal cases are given for the reason, as he declares, that he has never met with any. There is little to be said about the pathology of this method of treatment, as Dr. Heaton has had only one opportunity of making an autopsy on a person who had undergone the operation. His theory of the action of the irritant is as follows: "The operation is subcutaneous, the parts affected are fibrous tissue, and the irritation itself is mild. The parts chiefly and immediately affected by the foreign material are, with a single exception, fibrous or fibroid tissues, receiving but little or no red blood from the circulation, and supported chiefly by the nutritive juices. The disturbance excited does not exceed a low grade of irritation, and the moderate amount of lymph thus subcutaneously produced has a strong plastic or organising tendency. Also its production is largely interstitial, thickening the fasciæ and tendons, contracting and consolidating, though not absolutely closing up the entire fabric of the hernial or inguinal canal. Owing to the mildness of the preparation of quercus alba the irritation ceases in its earliest stage, and does not increase to a real inflammation, which, if it occurred, might readily run on to suppuration. Owing, moreover, to the peculiar slowness with which all fibrous tissues when irritated recover, as well as to the powerful plastic tendency of the lymph thus generated, the thickening contraction and consolidation which follow the irritation, persist for a most remarkable length of time so long that for all practical purposes they are permanent, or at any rate sufficiently so to enable nature to re-establish herself and effect a cure of the hernia.—(*The Boston Med. and Surg. Journal,* No. 22, 1877.)

**Massage and its value to the Practising Physician.**—In a translation of a paper on this subject by Dr. W. Wagner of Friedburg, it is said that (to give a notion of what is meant by massage and its effects) it will simultaneously further and increase resorption, accelerate the circulation, relieve pain, and reduce elevated temperature. Four different manipulations may be accepted as belonging to massage (1) effleurage, stroking; (2) petrissage, kneading; (3) passive and active motion; (4) tapotement, tapping or percussion, which is very proper for tissues of loose consistency. The discrimination of these four different kinds of massage will be quite enough for the physician. The *effleurage,* stroking or friction, comes particularly into use in the acute stage of inflammation, and it is done thus: after oiling the parts the upper half of the inflamed region is stroked from the periphery in order to empty the superficial veins and lymphatics, and so make room for their returning currents.. The friction must be extended in a centrifugal direction so as by degrees to come upon the affected parts. Here one will make direct pressure upon the tissues. By this the effusion or inflammatory products will be squeezed into the lymph vessels, and by them absorbed. The circulation of the blood is also influenced, for by the emptying of the superficial veins a more rapid stream sets in after raising the hand. By the mere pressure of the stroking hand, as this is in the direction of the returning current, a new mechanical power will be added to the blood stream in the superficial veins, which will naturally favour the more distal stream in the capillaries and small arteries. The cutaneous and vaso-motor nerves are also mildly irritated, in this manner a narrowing of the lumen of the arteries will occur, and consequently a relative increase of speed of the current in them. Let the same irritation become stronger, and we obtain a relaxation of the muscular coat of the arteries; yet a slowing of the blood-stream will not be produced by continued manipulation. Here, then, we have circumstances favourable for resorption, namely enlarged vessels with stronger and swifter currents in them.

Through these direct influences upon the lymphatic and blood-vessels, resorption of the effusion will be hastened; at the same time the swelling and elevated temperature will be reduced. The pain will also be diminished by freeing the sensitive nerves from the pressure upon their terminal filaments. With still greater power will the parenchymatous exudation be driven into the lymph vessels by skilful kneading, especially if at the same time the lymph and blood streams are hastened by a centripetal rubbing.

The *petrissage*, or kneading of a point or other part of the body, be it a muscle, or large ecchymosis into the subcutaneous cellular tissue, should be begun by circular rubbing with the ends of the fingers or with the whole hand, then pressure should gradually be made according to the firmness of the exudation and with due regard to the painful places. These manipulations may be done with both hands simultaneously, or what is better, with one hand we may knead and with the other do the centripetal stroking. By kneading, the exudation will become more fit for resorption, as a crushing of the elementary parts of the same takes place. Especially is this seen in the treatment of chronic rheumatic joint inflammations. The hyperplastic tissue will be broken up; the contents of the newly-formed blood-vessels will be extravasated, and later the vessels themselves obliterated, whilst the crushed mass, either with the extravasation, or later in the form of fatty detritus, passes into the lymph stream. Although we can atttack or destroy by this manipulation only the superficial strata of the exudation or the inflammatory new formations with their blood-vessels, yet the deeper lying mass will be reached indirectly by the extension of the pressure. The more the contained fluid of the affected mass, the greater will be the value of the hydrostatic transmission of the pressure.

Of great aid to the above-mentioned manipulations are from the beginning of the treatment, gently exercised, active and passive motions, the effects of which, besides accelerating resorptions, are as follows: (1) The prevention of inflammatory stasis; (2) loosening old adhesions, and preventing the formation of new ones; (3) favouring the entrance of diseased fluids into the lymphatics by changes in the relations of pressure in the different parts of the joint, for the power of pressure can be of value only in the direction of the centripetal stream on account of the valvular structures in the lymph vessels.

The fourth category of massage, *tapotement*, so-called, is a simple percussion of the affected parts with the palm of the hand, the fist, a little hammer, or other similar instrument. By this means we seek principally to influence the affected nerves or their terminations. In what manner the massage acts in this case is not quite clear. In a number of cases it did well in promoting absorption of the exudation from around the nerves, at the same time one can bring into use with good effect the previously mentioned manipulations. In other cases, particularly in neuralgia, percussion may bring about changes in the nerve, producing a temporary stunning, which may serve the purpose of definite cure. In paralysis, also, in consequence of general disturbance of nutrition, the effect of these manipulations will be to nourish the affected nerves. (*The Boston Med. and Surgical Journal*, No. 20, 1877.)

**Some uses of Vasaline and Salicylic Acid in Obstetrics.**—Dr. Henry Dubois states that for some time back it has been his practice to use vasaline with a grain or more of salicylic acid to the ounce and scented with a drop of otto of roses in all vaginal examinations instead of oil or soap. He believes he can thereby more certainly avoid carrying infection from case to case than would otherwise be the case. In first confinements it may be used in the first stage of the labour as soon as the patient takes to bed. He makes use of a glass syringe an inch in diameter, and without a nozzle. With an instrument of this kind he states that an ounce or more of the semi-solid vasaline can be introduced up to the os, where it remains at the temperature of the body in a semi-fluid state. If desirable, in certain cases, it can be combined with the extract of belladonna, and after the labour is completed with the extract of ergot, or in case of hæmorrhage, with the liq. ferri persulphatis, with all of which it mixes well. If it be desired to introduce it into the uterus, it can be rendered fluid by putting the bottle containing it into water of a temperature of 110° Fahr. when it can be used with the ordinary uterine syringe. In the course of a labour he uses three to six ounces with the effect, he believes, of shortening the first stage of labour, and rendering the parts, especially in first labours, easily dilatable; while in the second stage, after the placenta is delivered, a small quantity of the vasaline, with the acid added, disinfects the discharges and does much to prevent purulent absorption. Amongst other uses to which the mixture above mentioned is recommended, is that of a dressing for the umbilical cord. It answers also better than oil or soap to remove the smegma from the newly-born infant. Mixed with an equal weight of honey and ten grains of borax or of chlorate of potash to the ounce, it answers an excellent purpose in cases of thrush. The ointment alone, or mixed with ten grains of quinine to the ounce, quickly removes the small thread-worms to which children are liable. In the excoriation of infants it effects rapid healing. It is extremely serviceable in the sore eyes of the first few days of life, and lastly, when introduced into the nostrils with a camel's-hair pencil, it answers better than any other remedy he has tried in the "snuffles" which interfere so much with the efforts of the child to suck. (*The Medical Record*, No. 334, 1877.)

# Notes and Queries.

Unguentum Petrolei.—This substance, introduced into this country from America by Messrs. Allan and Hanbury, is a hydrocarbon somewhat resembling ordinary paraffine in chemical composition, but much softer, its consistence being about that of lard, for which it can be used as a substitute. It possesses this advantage over lard that it does not undergo oxidation and become rancid. It is preferable to it for preserving surgical instruments from rust, and for making several ointments such as oxide of mercury, ointments which are apt to decompose when made with lard. In its chemical properties it nearly resembles vasiline and still more closely cosmoline, both of which are paraffines, and it may be used as a substitute for these bodies, although it does not seem to possess any special advantage over them except in the name which gives some indication of its nature. Beyond the advantages it possesses as a basis for ointments and as a bland non-irritating substance, it seems to possess no special therapeutic virtues, but the qualities already mentioned render it a useful substance. The importers claim for it the following virtues:—

"(1) As an application to burns and scalds, inflamed and excoriated skin, chapped nipples, frost-bitten or chafed surfaces, inflamed hæmorrhoids, blistered parts, and as a dressing for wounds it has proved most satisfactory in numerous hospitals and dispensaries where it has been employed, as well as in the hands of private practitioners. Especially in diseases of the skin have its demulcent and anti-pruritic properties been recognised by all specialists, and it has already superseded the old 'benzoated oxide of zinc ointment,' and similar preparations.

"(2) As a lubricant it is much superior to lard, &c., for anointing the finger and hand in obstetric practice, and for coating the forceps, catheter, &c., previous to introduction. Surgical instruments, both steel and hard rubber, are perfectly protected from rust and cracking by an occasional application of Unguentum Petrolei.

"(3) As it is entirely bland, and is not acted upon in any way by the secretions of the stomach and bowels, it may be administered internally without hesitation. The flavour is not markedly unpleasant, and in inflammatory conditions of the stomach and intestinal tract its curative and disinfectant properties promise to render it a most valuable adjuvant in treatment. Either alone or medicated as an injection in urethritis, vaginitis, inflamed and irritable bladder, as a plasma in uterine diseases, as an application to inflammatory and diphtheritic sore throat, its adoption in preference to all other demulcents can only be a question of time."

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BALLIÈRE, of King William Street, Charing Cross.

# Department of Public Health.

## STATE MEDICINE.

Dr. Arthur Ransome's address on the present position of State Medicine in England, given at the recent meeting of the British Medical Association held in Manchester, and the Report of the Joint Committee on State Medicine of the British Medical and Social Science Associations read at the same meeting, convey to us the uncomfortable impression that Medicine, as represented by its great association here, is going somewhat astray on this important subject. It would seem to be drifting away from the practical questions which more immediately concern it into a speculative region which, however seductive, can hardly fail to discredit it at the present moment with politicians and with the public at large. Nothing could be more charming than Dr. Ransome's dream of a sanitary Atlantis, and we trust that he may live to witness his admirable conception of a College of State and Legal Medicine an accomplished fact, and to become himself the first Principal of so desirable an institution. Nothing, moreover, could perhaps be better devised for bringing about such thoroughness in public health administration as we all wish to see than the scheme suggested in the report of the Joint Committee. But that scheme is so antagonistic to the declared policy of the Government, as represented by both sides of the House, that we marvel at the courage (short-sightedness would perhaps be the better word) which could have prompted its submission to Lord Beaconsfield. (We do not, however, marvel at his refusal to receive a deputation of the Committee to urge the scheme upon him.) The removal of the distinction between urban and rural sanitary authorities, the clothing of all sanitary authorities with similar powers, the extension of these powers so as to enable them to carry out all purposes of local administration within their districts, the establishment of County Boards, to act as an intermediate body between the representatives of local and central government, the constitution of superintending and district medical officers of health, free from private practice, who should be "under central control, so far as making up one great body of workers for general State Medical purposes," paid in part by the State and "all forming parts of a great department of the State under the presidency of a minister of health,"—these are suggestions which in the present state of feeling and knowledge of our legislators on the subject can be regarded as little else than Utopian. They traverse the recommendations of the Royal Sanitary Commission which have so largely governed recent legislation in essential points as well as the administrative policy of the Government as represented by the Local Government Board, both under Mr. Stansfeld and Mr. Sclater-Booth. The suggestions of the Joint Committee in this latest report from it have been no doubt prompted by an intimate knowledge of the futility of recent sanitary legislation and administration. This has been such as to justify it in believing that the whole question is now hopeless without a "radical change." But it seems to have overlooked the fact that what is so obvious to it, is not obvious to, and in fact is largely denied by, the politicians with whom must rest the duty of initiating any change, to our legislators, and to the public generally. It seems to us, indeed, that the Joint Committee, in a natural eagerness to secure the legitimate results of the great awakening in sanitary matters to which it contributed so much in 1868-69, has overshot the mark. It has underestimated the still existing inertia of the public and of our legislators in these matters, and thus it happens that its suggestions, the outcome of a close, practical acquaintance with the subject, are liable to be looked upon by the people whom they most concern as more or less visionary, and medicine, so far as it is concerned in them, to be discredited as to its political acumen.

If, as we believe, the difficulties which hamper sanitary administration, as now carried out here, are perpetuated in consequence of insufficient acquaintance of the public, and particularly of our legislators, with the facts of that administration since the passing of the Public Health Act, 1872, it would follow that as precedent of further legislation inquiry should be made by Royal Commission or otherwise into the working of the sanitary laws since the institution of the Local Government Board. The time is particularly favourable for such an inquiry. The tentative period of five years in the operation of the essential medical element of these laws, has expired, and information is now available which would admit of the working of the laws being fully ascertained. To proceed with further sanitary legislation in the absence of such inquiry would be, we believe, simply to heap blunder upon blunder; and certainly it is only by an inquiry of the sort referred to that we may hope that legislators and the public generally can be brought to a sufficient knowledge of the actual state of the sanitary administration of the country. To promote such a Royal Commission for the purpose in question as it promoted the Royal Commission of 1869, is a work eminently within the functions of the Joint Committee. It is a work which, if successfully carried out, would not only confer an incalculable advantage upon the public, but would furnish the most conclusive proof of the judiciousness of that medical estimate of the necessities of public health administration which has been so consistently maintained by the Joint Committee.

But there is another question in which both Dr. Ransome and the Joint Committee have also missed in some degree, we think, the true practical bearing. This is a question which concerns Medicine itself. Dr. Ransome takes exception to the appointment of "legally qualified medical practitioners," simply as such, as medical officers of health, according to the existing law, without any special training for the office; and the Joint Committee would debar from the office all medical men who are not holders of diplomas of State Medicine. But both seem to forget that whatever discredit exists in this matter rests with the medical profession not with the Legislature. The appointments of medical officers of health, as an essential feature of local sanitary organization and administration, was accepted by the Legislature on the representation of the medical profession. Every legally qualified medical man was made eligible for the post, as at the time no class of medical men existed specially qualified for it, nor does one, except as a sort of sanitary curiosity, exist now. It is a disgrace to the Medical Council and our great examining bodies that, knowing the desirability for special training for the post, they have taken no steps to meet this requirement at all commensurate with the magnitude of the occasion and such as to justify the confidence of the Legislature in the general capabilities of the profession to perform the functions of the post. This dereliction of a great public and professional duty is accentuated in the public mind by the isolated action of a few examining bodies, such as the Universities of Cambridge and of Dublin, and by the representations of associations, such as the British Medical, and of individuals distinguished in sanitary science, such as Dr. Ransome. Meanwhile the great army of medical officers of health, created by the Public Health Act, 1872, is foolishly banned by its own profession as incompetent (an incompetence true only as things go in a very restricted although important sense), the profession failing to see that an abundant excuse is thus furnished to administrators such as Mr. Stansfeld and Mr. Sclater-Booth, to treat the medical officer of health in his public relations in a very different way from that which the profession had hoped for and desired. Mr. Stansfeld and Mr. Sclater-Booth might very justly answer with regard to much that is alleged against the Local Government Board in its treatment of medical officers of health, "We have dealt with them according to your own estimation of their worth as such officers. What more would you have?" In fact the profession has not been true to itself in this matter, and, in homely phrase, has itself fouled the new official nest which the Legislature has provided for it. Until the profession, through its representatives, shows a juster sense of the important field of work opened for it in public health administration, by securing that every medical man shall be properly qualified in the special sense held by the Joint Committee for the post of medical officer of health, or that provision for such special training shall be made commensurate with the requirements of the public health medical service, Medicine in that service must go to the wall.

No more shameful fact exists in connection with the bitter struggles to which the recently created public health medical service has been, and is subjected, and the manner in which it has been made the catspaw of successive administrations, than the passiveness of the great medical representative bodies in the matter. Just as they failed to understand the moral responsibility resting upon them by the creation of a public health medical service, so have they failed to comprehend the importance of giving their moral support to the first incumbents of the service, upon whom has fallen the brunt of the struggle. They have acted as if no higher conceptions of professional relationship existed among them than such as befitted a mere trade guild. At every turn the efforts made by the medical officer of health to secure for his office and the exercise of his functions such consideration from the Local Government Board and from local authorities, as were held by the teachings of the profession to be just, have been tacitly disavowed by our representative bodies. The Local Government Board and local authorities have, in effect, followed suit in this matter, and the public health medical service has, for the moment, gone to the wall.

The question here imperfectly touched upon well deserves the attention of the British Medical Association. If it should accept the views here expressed, the Association alone possesses the means of letting some light into the inner recesses of the Medical Council and other corporate professional bodies on the subject.

## ON THE PROPAGATION OF SCARLET-FEVER THROUGH THE AGENCY OF MILK.

In the *Practitioner* for August, 1876 (p. 155) we gave an abstract of a report by Dr. Buchanan, the Assistant Medical Officer of the Local Government Board, on an outbreak of scarlet-fever at South Kensington, which appeared to have been occasioned by infected food, presumably cream. We have now to record an outbreak of scarlet fever at New Barnet, in the northern environs of the metropolis, also apparently caused by infected food, in this instance presumably milk. This outbreak has been investigated by Dr. C. E. Saunders, the Medical Officer of Health for the district, and we reproduce here substantially the report he has presented of the results of his investigations to the Local Authority:—

The outbreak took place at the end of April, 1877, and in the early days of May, 128 cases of the disease having occurred between the 29th of April and the 4th of May. The total number of cases happening during the two months was 140.

Early in the inquiry as to the cause of the outbreak, attention was directed to the elucidation of certain facts having important bearings on the etiology of the disease, viz., the considerable area over which the disease was diffused, the mild character of the cases, the short incubative period intervening between the probable exposure and the occurrence of definite symptoms of the disease, and the almost sudden cessation of cases after May 4th.

Dr. Saunders's experience and that of others had taught him that such general characters as were here combined were found in epidemics traced to milk infection, and his first care was to ascertain the various milk supplies of the district; at the same time keeping in view other circumstances to which the epidemic might be due, and trusting only to the logic of facts for arriving at a definite conclusion as to what the cause was. The direction the inquiry took from the commencement promised to yield fair results, and the subsequent and more careful investigation of details went far beyond his expectations in showing what he believes to be the means by which the disease was disseminated.

Some persons, as a mere guess, attributed the outbreak to the condition of the sewers, without taking the trouble to ascertain if the history of the disease in any way accorded with such a view. Dr. Saunders is very far from saying that such a means of the diffusion of scarlet fever was not possible, or that the sewers at New Barnet are beyond reproach; but he holds that he should only be justified in assuming that the sewers had been the source of the evil, if the grouping of facts in any way suggested it, and in the absence of a more likely cause.

In an epidemic involving so many cases, facts, not as mere isolated instances, but accordant facts, indicating definitely the sewers as the cause of the outbreak, would scarcely have failed had the sewers exercised any marked influence on it. No facts of this kind are, however, forthcoming; on the contrary, there are certain facts directly opposed to the opinion that the sewers co-operated in producing the outbreak.

The plan of investigation adopted by Dr. Saunders was to obtain information of every house in the roads in which one or more cases of the fever had occurred.

It was stated to him that a particular dairyman supplied considerably more milk than all the other dairymen put together, and thus that there would be more people among his customers to have the disease. However true this statement might be as regards the rest of the district, it was unmistakably incorrect as regards those portions of it in which actual cases of scarlet fever have occurred.

The table accompanying the report shows this clearly. For instance:—In the Station Road, A., the vendor of the suspected milk, supplied 7 houses, while B., C., D., other milk vendors, supplied 21 houses. In the Lyonsdown Road, A. supplied 10 houses, B., C., or D., an equal number. In the Richmond Road West, A. supplied 4, while B., C., or D. supplied 9 houses. In the Somerset Road West, A. supplied 7, while B., C., or D. supplied 15 houses and so on.

TABLE SHOWING THE DISTRIBUTION OF SCARLET FEVER CASES, THE NUMBER, AND DATES OF ATTACK, TOGETHER WITH PARTICULARS OF THE MILK SUPPLY OF THOSE LOCALITIES IN WHICH THERE WAS ANY CASE OF FEVER.

| Locality. | Number of Cases. | *Dates of Attack. | Houses supplied with Milk by A. | | Houses supplied with Milk by B., C., or D. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | (1) In which there was fever. | (2) In which there was no fever. | In which there was fever. | In which there was no fever. | |
| Lyonsdown Road . | 10 | April 29-30. May 1-2-3 | 4 | 6 (5 doubtful) | ... | 10 | A. Cases of Sore Throat occurred on April 30, May 1 returned as "doubtful." |
| Richmond Road East | 5 | April 7. May 2 | 2 | 1 | ... | 4 | |
| Richmond Road West | 3 | May 2-4 | 2 | 2 (1 doubtful) | ... | 9 | A. Date of doubtful case May 1. |
| Somerset Road East | 5 | April 29-30. May 1-2 | 2 | 3 (2 doubtful) | ... | 3 | A. Two doubtful cases April 30, May 1. |
| Somerset Road West | 6 | April 30. May 1-2-3 | 3 | 4 (2 doubtful) | ... | 15 | A. Two doubtful cases May 1. |
| Gloucester Road East | 2 | May 1 | 1 | 2 (1 doubtful) | ... | 4 | A. One doubtful case May 1. |
| Gloucester Road West | 1 | May 8 (?) | 1 | — | ... | 5 | |
| Station Road . . . | 21 | A. 23(?)29 30. M. 1-2-3-4 | 6 | 1 | ... | 21 | |
| Margaret Road . . | 4 | May 2-4 | 3 | 2 (1 doubtful) | ... | 10 | A. One doubtful case May 1. |
| King Edward Road . | 7 | April 30. May 1-2-3-4 | 2 | ... | 1 | 6 | |
| St. Wilfred Road . | 8 | May 1-2-18-24 | 5 | 4 | ... | 4 | |
| Henry Road . . . | 4 | April 16. May 22 | 3 | 4 | 4 | 13 | A case, supplied by B., C., or D., occurred April 16. |
| Lancaster Road . . | 6 | May 2-3 | — | 2 | 2 | 50 | |
| Leicester Road . . | 20 | April 30. May 1 | 6 | 10 | ... | 38 | A. Two qts. of milk used by 3 families in which 3, 3, 4 cases respectively occurred |
| Warwick Road . . | 2 | May 1 | 2 | ... | ... | 4 | A. Two pints of milk used daily. |
| Lytton Road . . . | 5 | April 30. May 1-2 | 3 | 2 | ... | 7 | A. Two pints of milk used daily. |
| Bulwer Road . . . | 4 | May 1-2-9 | 5 | 4 | ... | 16 | A. One-and a-half pint used daily. |
| York Road . . . | 3 | May 3-8 | 1 | ... | 1 | 10 | Case supplied B., C., D., it is noted "patient drinks scarcely any milk," while in the family of one of the cases supplied by A. three-and-a-half pints are used. |
| Victoria Road . . | 13 | Apr. 18. May 1-2-3 4-24 | 5 | 24 | 1 | 32 | |
| Albert Road . . . | 1 | May 21 | 1 | 6 | ... | 16 | |
| Willenhall Lodge . | 1 | May 1 | 1 | ... | ... | ... | |
| Totals . . . | 131 | . . . . . . . . . | 58 | 77 | 9 | 277 | |

* When more than one case occurred on the same day, only one date is given.

The total number of cases reported was 140. Of these 12 occurred before April 29th, or since May 4th, leaving 128 which happened in the days intervening between these dates. Of these 140 cases, 131 were supplied by A., 9 being supplied by B., C., or D.

In addition to these 140 cases of fever, there were 12 cases of sore throat (marked "doubtful" in the table) coincident with the fever outbreak. All these cases were supplied by A., while no such case is recorded as having occurred among the people under observation[1] supplied by B., C., or D., although details of their state of health were obtained during the period in question.

In addition to the foregoing facts, Dr. Saunders directs attention to the following isolated occurrences :—

A case occurred where a young lad drank A.'s milk and had fever, while a younger child in the same family took B., C., or D.'s milk, and did not have fever.

Three members of one family drank A.'s milk and all had fever ; the rest of the family drink "condensed milk" and have not had fever.

In an isolated house, unconnected with any sewer, a case of fever (drinking A.'s milk) occurred.

A typical case, with a considerable amount of desquamation of cuticle, occurred in a person drinking A.'s milk, and who had not been outside his house for a considerable time.

In a family consuming 3½ pints daily of A.'s milk there were 3 cases of fever.

In 3 families consuming each a quart of A.'s milk daily, there were 2, 3, and 4 cases of fever respectively.

It will not be a matter of surprise to any one who takes the trouble to consider the circumstances of the case, and the difficulties which surround investigations of this kind, involving as they necessarily must do, some private interests, that Dr. Saunders has no conclusive facts to adduce as to how the poison of scarlet fever reached the milk. He has, however, obtained certain facts warranting a very strong belief on this point, but these for the present he is not at liberty to make public.

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[1] *i.e.* In contiguous houses to fever cases.

## SANITARY LEGISLATION IN THE PAST SESSION (1877).

THE measures of sanitary legislation submitted to Parliament during the last session were, with one exception, the measure relating to canal boats, abortive.

On the 15th March the Chief Secretary (Sir Michael Hicks Beach) and the Attorney-General for Ireland introduced a Bill to consolidate and amend the Acts relating to Public Health in Ireland. The proposed amendments made no provision for the removal of several marked injustices to which the Medical Officers engaged in the administration of the Public Health Act, 1874, were subjected. Strong representations on this point were made to Sir Michael Hicks Beach by the King and Queen's College of Physicians and the Royal College of Surgeons of Ireland, and by the Irish Medical Association on this subject and on other matters relating to the Bill. The Chief Secretary's answer to these representations was not wholly satisfactory. Throughout it betrayed a tendency to regard the medical aspect of sanitary administration as of subsidiary importance. The Bill had to be withdrawn in consequence of the opposition it met with from Irish representatives in the House of Commons. The measure will probably be reproduced in the course of next session, under conditions, it is to be hoped, more favourable for its proper consideration.

On the 4th June, 1877, the President and Parliamentary Secretary of the Local Government Board (Mr. Sclater-Booth and Mr. Salt) introduced a Bill to consolidate and amend the Law relating to Public Health in the Metropolis. The preamble of this Bill recited, that whereas by the Public Health Act, 1875, certain Acts relating to Public Health were, as regards England, exclusive of the Metropolis, repealed, and by that Act consolidated with amendments: and whereas it is expedient that the said Acts as regards the Metropolis also be repealed, and be consolidated with like amendments, and that better provision be made for regulating the foundations of buildings and the sanitary arrangements of dairies within the metropolis, be it enacted, &c. The consolidation proposed was unsatisfactory, as it was limited to Acts which included but a few fragments of the sanitary duties imposed upon the Local Authorities of the Metropolis. Moreover, the amendments proposed, especially such as related to the power of Local Authorities to provide hospitals, raised questions upon which considerable difference of opinion existed between Local Authorities themselves, and between these authorities and the Local Government Board. The Bill, indeed, was received with much disfavour by the Metropolitan Local Authorities, as also by the Metropolitan Asylums Board, which was affected by it in respect to providing hospital accommodation for sick persons, other than paupers. Eventually the Bill was withdrawn, Mr. Sclater-Booth intimating at the time that he should be prepared in a future session to introduce a more comprehensive measure.

"The Canal Boats Act, 1877," the one sanitary measure which received the sanction of the legislature during the session, although primarily a sanitary Act, includes also provisions as to education. It is a short Act of seventeen sections, and it provides for the registration and sanitary regulation of all canal boats used as dwellings. By this Act the Local Government is empowered to make regulations (*a*) for the registration of canal boats, including certificates of registration and the fees in connection therewith; (*b*) for the lettering, marking, and number of such boats; (*c*) for fixing the number, age, and sex of the persons who may be allowed to dwell in a canal boat, having regard to the cubic space, ventilation, provision for the separation of the sexes, general healthiness and convenience of accommodation of the boat; (*d*) for promoting cleanliness in, and providing for the habitable condition of canal boats; (*e*) and for preventing the spread of infectious disease by canal boats.

After the expiration of twelve months from the date of the passing of this Act (14th August, 1877), or if the regulations of the Local Government Board above-mentioned have not at that time come into force, until after the expiration of six months from the date at which they have come into force, a canal boat may not be used as a dwelling unless registered in accordance with the Act.

Sections 4 and 5 of the Act are of peculiar importance, with reference to the power of a sanitary authority as to the prevention of infectious diseases in canal boats, and of inspecting them. We reproduce these sections textually:—

"4. Where any sanitary authority within whose district a canal or any part of a canal is situate is informed by the master of a canal boat or otherwise that a person on a canal boat is suffering from an infectious disorder, the authority shall cause such steps to be taken as may by the certificate of their medical officer of health, or of any other legally qualified practitioner, appear requisite for preventing the said disorder from spreading, and for that purpose may exercise the power of removing a person suffering as aforesaid, and all other powers in relation to provisions against infection conferred by the Public Health Act, 1875, and may also, if need be, detain the boat; but such boat shall not be detained a longer time than is necessary for cleansing and disinfecting the same.

"5. Where any person duly authorised by a registration or sanitary authority, or by a justice of the peace, has reasonable cause to suppose, either that there is any contravention of this Act on board a canal boat, or that there is on board a canal boat any person suffering from an infectious disorder, he may, on producing (if demanded) either a copy of his authorisation, purporting to be certified by the clerk or a member of a sanitary authority, or some other sufficient evidence of his being authorised as aforesaid, enter by day such canal boat and examine the same and every part thereof, in order to ascertain whether on board such boat there is any contravention of this Act, or a person suffering from an infectious disorder, and may, if need be, detain the boat for the purpose, but for no longer time than is necessary.

"The master of the boat shall, if required by such person, produce to him the certificate of registry (if any) of the boat, and permit him to examine and copy the same, and shall furnish him with such assistance and means as such person may require for the purpose of his entry and examination of and departure from the boat in pursuance of this section.

"A refusal to comply with the requisition of such person under this section shall be deemed to be an obstruction of such person.

"If such person is obstructed in the performance of his duty under this Act in the case of any boat, the person so obstructing shall be liable to a fine not exceeding forty shillings."

The power of detention here given removes one of the greatest difficulties hitherto experienced by sanitary authorities in dealing with infectious diseases on these boats.

## THE POLLUTION OF RIVERS.

On the 17th August the Rivers' Pollution Prevention Act of 1876 came fully into operation, and the Local Government Board, the central authority under the Act, has issued a circular to sanitary authorities directing their attention to the fact, and summarising the principal provisions of the measure. It may be well to recall here the evils against which this Act is aimed, premising that "innocuous discoloration" of streams is not regarded as pollution within the meaning of the Act, and that tidal waters are not held to be streams for the purpose of the Act, until they have been declared to be such by an order of the Local Government Board, "after local inquiry and on sanitary grounds." The sea, after like inquiry, and to such extent as may be determined may also, by an order of the Board, be brought within the operation of the Act.

Offences against the Act (to follow the circular of the Local Government Board) are divided into four classes, according as they consist of the pollution or obstruction of streams:—

(1.) By the solid refuse of any manufactory, manufacturing process, or quarry, or any rubbish or cinders, or any other waste, or any putrid solid matter;

(2.) By solid or liquid sewage matter;

(3.) By any poisonous, noxious, or polluting liquid from any factory or manufacturing process; or

(4.) By the solid matter from any mine, in such quantities as to prejudicially interfere with the due flow of the stream, or by any poisonous, noxious, or polluting solid or liquid matter from any mine, other than water in the same condition as drained or raised from the mine.

In proving the pollution of the stream, or interference with its due flow, in the first class of cases, evidence may be given of repeated acts, which together cause the pollution or interference, although each act, taken by itself, may not be sufficient for that purpose. It will be an offence of the second class, except in certain exceptional cases mentioned in the Act, to cause to fall or flow, or knowingly to permit to fall or flow, or to be carried into any stream any solid or liquid sewage matter.

The provisions in relation to sewage pollutions are of peculiar interest, inasmuch as any infringement of them will render a Sanitary Authority liable to hostile proceedings under the Act, on the part either of other Sanitary Authorities, or of any person or body of persons aggrieved by the commission of the offence.

In determining whether or not such an offence has been committed, a marked distinction is drawn between the cases in which the sewage is conveyed into the stream along channels, the construction of which had not been commenced at the time of the passing of the Act, and those in which it is so conveyed along channels then already existing, or in process of construction. In the former cases it will be an offence against the Act for any Sanitary Authority to cause or permit the discharge into any stream of any solid or liquid sewage matter. In the latter an offence will not be deemed to have been committed if it can be shown to the satisfaction of the Court having cognizance of the case that the best practicable and available means are used to render the sewage harmless. Moreover, in this class of cases power has been given to the Local Government Board of suspending, in any particular instance, for a limited period the operation of this portion of the Act beyond the twelve months allowed by the statute, provided that they are satisfied, after local inquiry, that further time ought to be granted to the Sanitary Authority for the purpose of enabling them to adopt the best practicable and available means for rendering the sewage harmless.

In connection with offences of this class it should be stated that where any Local Authority or any Rural or Urban Sanitary Authority have been empowered or required by any Act of Parliament to carry any sewage into the sea or any tidal waters, nothing done by such Authority in pursuance of such enactment will be deemed to be an offence against the Act.

As regards pollutions from factories or manufacturing processes, a distinction is drawn similar to that already referred to with respect to sewage pollutions, between the cases where the liquid finds its way into the stream along a channel used, constructed, or in process of construction at the date of the passing of the Act, or any new channel constructed in substitution thereof, and having its outfall at the same spot, and those in which it is conveyed into the stream along a channel not falling under either of the above descriptions. In the former cases an offence against the Act will not be deemed to have been committed, if it can be shown to the satisfaction of the Court (the County Court) having cognizance of the case that the person complained of is using the best practicable and reasonably available means to render the liquid harmless.

With respect to pollutions from mines, an offence will not be deemed to have been committed if it can be shown to the satisfaction of the Court that the person complained of is using the best practicable and reasonably available means to render the polluting matter harmless ; and it must be observed that it is immaterial in this case whether the channel by which the discharge is effected was or was not constructed or in process of construction before the passing of the Act.

Subject to certain restrictions contained in the Act, every Sanitary Authority will have power to enforce its provisions in relation to any stream which is within, or which passes through or by any part of their district ; and for this purpose they may institute proceedings in respect of any offence against the Act which causes within their district the pollution of any stream, or an interference with its due flow. These proceedings may be taken either against any other Sanitary Authority or against any person or body of persons, and whether or not the offence is committed within the district of the prosecuting Authority.

The restrictions referred to are especially designed to prevent vexatious proceedings being instituted under the Act, or proceedings which might inflict material injury on manufacturing or mining industries.

One of the most important provisions in the Act is that under which inspectors of proper qualifications, appointed by the Local Government Board are authorised to grant certificates to the effect that the means used for rendering harmless any sewage, or poisonous, noxious or polluting solid or liquid matter discharged into any stream are the best or only practicable and available means under the circumstances of the particular case. Such certificates will, in all Courts and proceedings under the Act, be conclusive evidence of the fact, and they must also be taken into consideration by any Court before which any legal proceedings are pending with reference to the pollution of any stream, although such proceedings may not have been instituted under the Act. If any party is aggrieved by the grant or withholding of a certificate, an appeal may be made to the Local Government Board against the decision of the inspector ; and the Board may either confirm, reverse, or modify his decision, and may make such order as to the party or parties by whom the costs of the appeal are to be borne, as they may think just.

The certificate will continue in force for a period to be named therein, not exceeding two years ; and at the expiration of that period it may be renewed for the like or any less period. The expense of obtaining the certificate must be paid by the applicants.

Mr. Robert Rawlinson, C.B., the Chief Engineering Inspector of the Local Government Board, and Dr. Angus Smith, F.R.S., the Chief Inspector under the Alkali Acts, have been appointed Inspectors for granting the certificates referred to.

The difficulties besetting the efficient operation of this Act are very numerous, and it may well be doubted whether in its present form it will effect all that may be desired from it. It fixes, however, in the Statutes the great principle that the pollution of rivers with noxious matters is an offence against the public weal.

## THE WATER-SUPPLY OF THE METROPOLIS.

There would appear to be a reasonable probability that the most vexed of the several vexed questions which attach to the water-supply of the metropolis is on the verge of solution. We refer to the question of a supply uncontaminated by sewage, and which may meet the most refined conceptions as to potability. It is a curious comment upon practical exigencies that the probable clue to the solution of this question should have been discovered now, not so much from a direct consideration of it, as from the consideration of another vexed question of the metropolitan water-supply, namely, the supply for the extinction of fires. It is true that the two questions have been considered together, but the immediate incentive to the consideration which at present concerns us was the supply for the extinction of fire, and dealing with this question, as it so happens, has suggested a means of dealing with the other at the same time, and by the same means, which gives a reasonable promise for the solution of both which has not hitherto been attainable.

In March last the Metropolitan Board of Works instructed their engineer, Sir J. W. Bazalgette, in conjunction with Messrs. F. J. Bramwell, C.E., and Edward Easton, C.E., to prepare a report on the best means of providing an efficient supply of water for extinguishing fires, and for other purposes, in the metropolis. This report has now been presented to the Board and made public. It sets forth that the question of finding a satisfactory water-supply for a town of a few thousand inhabitants is frequently a very difficult one; but the magnitude of London and its situation, remote from large tracts of uncultivated and suitable catchment areas, enhance these ordinary difficulties to a degree for which there is no standard of comparison. The eight companies which supply the metropolis with water, it would appear, deliver a daily average of about 120 millions of gallons of water, and five out of these eight companies derive the whole of their supply from the Thames, while a sixth, by its new works, takes a portion of its supply therefrom, and obtains the remainder from the River Lea. It is against the quality of the Thames water and of the Lea water that the complaints are made, and it is urged in support of them that the best system of filtration is, after all, but a palliative, and that even if it were more than this, it could not remove the knowledge of the fact, that the water which is being drunk is derived from rivers that have received the sewage of a large portion of the residents of the basins of the Thames valley and of the Lea valley above the intakes of the London water companies, as well as the drainage from the highly-farmed and manured surfaces of those basins.

Of the different schemes which have been proposed for improving the metropolitan water-supply, the reporters refer particularly to the suggestions that the Metropolitan Board of Works should obtain entire control of the supply, and that water should be obtained either from the Welsh hills or from the lakes of Westmoreland or Cumberland. The reporters estimate that the first cost of purchasing the rights of property of the existing water companies would amount to from £20,000,000, to £25,000,000, and that this enormous expenditure being undertaken, the questions as to fire-extinction and to the potability of the water would remain as they were. With respect to drawing the water from gathering grounds at a great distance or from the lakes, they observe that although a proper potable water might be thus secured, no approach would be made to removing the difficulty of a supply for fire-extinction. For rightly to meet the exigency of fires in London it is desirable that it should be practicable to deliver water in volume from the level of the street under a pressure of not less than 350 to 400 feet, the present pressure in the mains of the different companies not exceeding, as a rule, 40 feet. Such pressure could not be given by existing water companies without an entire reconstruction of main-fittings and pipes, and an annual charge for pumping so large as of itself to make it desirable that some alternative scheme should be sought; the question of potability remaining as it was. After considering the whole of the difficulties besetting the questions submitted to them, aided by the light of previous official inquiries on the subject, the reporters submit a plan, a modification of suggestions made by others at various times, which they believe will solve not only the fire-extinguishing difficulty, but also "the other and far more important question and difficulty" (as they justly phrase it), that of the potable water.

Although the average daily supply of water per head, in the metropolis, is over 30 gallons, the reporters, "after careful consideration," estimate that not more than 2 gallons per head is really useful for drinking and for cooking, say, 8,000,000 of gallons daily for the whole metropolis. The quantity required for the purpose of extinguishing fires, although large for the time that the fire is raging, is not, on the average for the year, more than a 400th of the total supply, or at the rate of 300,000 gallons per day, making for potable, for culinary, and for fire purposes, 8½ millions of gallons a day; but to allow for increase of population, and to provide for contingencies, the reporters base their calculations upon 16,000,000 of gallons a day.

"Now," say the reporters, "although there are insuperable difficulties in substituting for the water at present pumped from the Thames and Lea, water from other and acceptable sources, there would be no difficulty whatever in obtaining from the country surrounding London the sixteen millions of gallons, or double that quantity if necessary, of the purest, brightest, and most palatable and wholesome water that can possibly be desired.

"We propose to supply, by separate mains, constantly charged, this pure, spring water, under high pressure, for potable purposes to every house, and to use the same mains, water, and pressure, for the service of the hydrant jets to extinguish fire.

"To carry this out we should provide, on the high ground to the north and to the south of London, four covered service reservoirs, holding an aggregate quantity of 32 millions of gallons, or enough for four days' consumption.

"These reservoirs would be at 400 feet above Ordnance, and from each reservoir would proceed sets of arterial mains which would traverse the metropolis (crossing the river), and would be coupled up so as to put all the reservoirs into communication.

"From these arterial mains, supply mains would proceed along the streets.

"It is agreed on all hands that the best position for hydrants is at the footway rather than in the roadway. This being so, we propose to lay the supply mains under the footway at each side of the road. This would have the additional advantage of making the cheapest possible connection with the hydrants, and at the same time interfering to the least extent with existing pipes, and with the paving and road traffic.

"And this position of the supply mains would also involve the least cost and difficulty in the connection of the house services for potable water.

"In each house we propose to fix an air-tight pressure receiver, holding, according to the size of the house, from two to ten gallons. This receiver would be placed in the basement, and close to the point of inlet of the service pipe. It would have only one draw-off tap, from which the water would be taken, and when the receiver was emptied it would be so arranged as to fill up again gradually.

"To revert to the covered service reservoirs.

"For the purpose of supplying these, we propose to sink, in the great water-bearing strata in the country districts around London, wells and borings at distances varying from about fifteen to twenty miles from the centre of the metropolis, and by proper pumping stations to lift the water from them into the four reservoirs. We have estimated for two sources of supply, and for two pumping stations for each reservoir, making a total of eight pumping stations from which to derive the sixteen millions of gallons per day."

The cost of carrying out this plan is estimated at £5,500,000 sterling, with a total annual charge of £225,000. Against this estimated annual charge there are set-offs showing, according to the data given, an absolute saving of £187,000 as compared with the annual charge for the outlay that must be made to render the present water supply adequate for the extinction of fires by hydraulic jets—an outlay, as it is observed, which would in no way solve the more important question of potability.

The reporters claim for their plan the following advantages:

"1st. It affords the most wholesome and agreeable potable water.

"2nd. By providing throughout the metropolis a full supply of water, at an adequate pressure, for effectually extinguishing fires by hydrant jets, it renders serious fires almost impossible, and thus effects an enormous annual saving of property.

"3rd. It accomplishes both objects, without interfering with the existing water companies.

"4th. It reduces to a minimum the alteration of the existing house-fittings, one simple and inexpensive fitting to each house being all that is required.

"5th. It is the only plan by which the essentials of a proper supply of pure drinking water, and a supply for fires at high pressure, can be provided at a moderate expenditure, even if the Metropolitan Board should become the proprietors of the Water Companies' undertakings."

We content ourselves for the present with simply presenting an outline of this important, and, as we believe, hopeful scheme.

THE PRACTITIONER.

NOVEMBER, 1877.

## Original Communications.

# ON SOME OF THE MINOR THERAPEUTIC USES OF SALICIN.

BY T. J. MACLAGAN, M.D.,

*Physician to the Dundee Royal Infirmary, Examiner in Medicine to the University of Aberdeen.*

SALICIN is chiefly of service in the treatment of acute rheumatism.

So much evidence on this point has now been added to that brought forward in my original paper on the subject (*Lancet*, March, 1876), that the efficacy of the drug in the treatment of that disease can no longer be regarded as matter of doubt.

Though its major, that is not its sole therapeutic use.

Dr. Thomson of Peterborough has recently reported most favourably of its curative action in intermittent fever, one of the ailments for which it was recommended nearly half a century ago.

The object of the present paper is to give my experience of its use in the treatment of one or two other very common ailments.

*Neuralgia.*—The cases of neuralgia in which I have found salicin of most service, are those in which the pain comes in periodic exacerbations, and in which quinine either fails to do good, or is for some reason inadmissible. It is, indeed, as an occasional substitute for quinine that salicin finds its place in the therapeutics of neuralgia.

Like every other remedy it is not infallible; but it has also its own sphere of usefulness, as the details of a few cases will show:

Case I.—A married lady, aged twenty-five, of not very robust health, occasionally suffers from attacks of facial neuralgia. I saw her thus suffering in May 1875. On the 4th of that month, after slight exposure to cold, she was seized with pain in the right eye, and right side of forehead; the pain came on between seven and eight in the evening, and was very severe till one or two in the morning, when it left, and she fell asleep, waking about eight o'clock quite free from pain.

In the evening it returned about the same hour as on the previous day, lasted for the same time, allowing her about two o'clock to fall into a sleep from which she awoke feeling quite well. On the 6th the same thing happened again. On the morning of the 7th she consulted me.

I prescribed twenty grains of quinine a day in divided doses—five grains in the morning, five in the afternoon, and ten at six in the evening. The first dose, taken at eleven, was followed by headache and troublesome tinnitus; the second, taken at two, caused intense headache and made her so deaf that she got alarmed, and did not take the evening dose. The pain returned about the usual time, and ran the same course as before. She thought it was less severe, but the headache was so bad that she could not be sure.

On the 8th she had a saline aperient which acted freely. The pain came back as before.

On the 9th she took salicin, twenty grains at eleven, twenty at two, and forty at six o'clock, in all eighty grains. She had no pain that evening; and went to bed at ten o'clock feeling quite well.

On the 10th she took the same dose, and remained free from pain.

She had no return of it; but as a precautionary measure took twenty grains of salicin three times a day for a week.

Since that time this lady has had several returns of her neuralgic pain. It has always speedily yielded to the salicin.

On the last occasion on which it returned, in June 1877, I gave instead of salicin, salicylate of soda in the same dose as the salicin, twenty, twenty and forty grains.

The pain was the same in seat and character as in former attacks, coming in the evening and vanishing at early morn. The salicylate was thus taken for two days without effect: the pain was as bad as ever. On the third day I increased the dose to thirty, thirty and sixty grains; but the pain came back in the evening as usual; and the patient complained of the head feeling so full and heavy that she could scarcely raise it from the pillow. Had in all 280 grains of salicylate.

On the following day I stopped the salicylate, and gave salicin in the old dose, and with the same effect as before. There was no return of the pain after 80 grains had been taken. As on former occasions she took the salicin for a week. She has had no pain since then.

The salicin did not produce the least discomfort.

Case II.—A lady, aged 45, at various times suffered severely from facial neuralgia. Being the wife of a medical man she had every justice done to her in the way of treatment.

In June 1876, I saw her suffering acutely from pain in the course of the left supraorbital nerve. The pain was periodic, coming on about five in the morning, and lasting generally till noon. She was taking tonics to improve her general condition.

I recommended quinine in large doses, but her husband told me she could not take it, as it simply maddened her. She herself said she would rather have the pain than take quinine.

I, therefore, suggested salicin. She took twenty grains at six o'clock, and forty grains when going to bed at eleven o'clock. She slept soundly all night, and woke the next morning free from pain.

She continued to take the remedy for a week, and had no return of the pain.

She had no discomfort from the salicin.

Case III.—A gentleman, aged 40, had an empyema, the matter of which got exit through the lung more than a year before I saw him. The chest was still in a very unsatisfactory state. His strength was, of course, much reduced, but he could go for a drive when the weather was fine.

He occasionally suffered very severely from cervico-occipital neuralgia.

I saw him thus suffering on March 6th, 1877. The pain was worse in the right occipital region, but affected also the left side. The course of both occipital nerves was tender on pressure. The pain was constant, but always got much worse in the evening.

I gave six grains of quinine every four hours during the day. He took this for three days without getting relief, but without suffering from any inconvenience except slight deafness and troublesome tinnitus. On March 10th the pain was unabated; it troubled him all day, and was, as usual, very severe in the evening.

On March 11th he got thirty grains of salicin every four hours. He had the pain that evening but not nearly so acutely.

On the 12th, (after taking 150 grains) he was free from pain, which did not return even at night. He continued to take the same dose of salicin. There was no return of the pain, but he took thirty grains of salicin twice a day for a week.

Two months afterwards the neuralgia returned. It was the same in seat and character as before. On this occasion I gave thirty grains of salicylate of soda every four hours. He took this for three days (in all 360 grains) with no relief to the pain. He complained of its destroying his appetite and making him perspire and feel very hot (though his temperature was not raised). The salicylate was omitted, and salicin was given as before, and with the same result, the pain was quite gone after six powders of thirty grains each had been taken, *i.e.* 180 grains.

These cases suffice to show that we have in salicin a useful addition to our available means of treating a very troublesome ailment.

I have tried it in all forms of neuralgia, but have found it most serviceable in cases in which the pain is more or less periodic. It should be given in large doses. In none of my cases was a less dose than eighty grains in twenty-four hours administered. In none did it disagree or cause any symptom more troublesome than tinnitus.

A remedy which does not disagree, and which sometimes succeeds where quinine fails to relieve a periodic tic, is one which may fitly claim a place in the therapeutics of neuralgia.

*Cold in the head.* (Coryza, rhinitis).—This most troublesome ailment is one which we are seldom called on specially to treat;

partly because (except in infants) it is not a source of anxiety, and partly because every one knows that remedies are of little avail in shortening the duration or mitigating the severity of the attack.

The following cases are given in the hope that others may be induced to try the treatment by salicin, and that my experience may not be singular.

Case I.—Occurred in my own person. In February, 1875, I had a bad cold in the head; felt oppressed, and miserable, and stupid; the forehead felt dull and heavy, the eyes were watery, there was frequent sneezing, and some running at the nose. But why describe the symptoms? every one knows them. And every one knows too that they generally last for several days, if not for a week.

I was making observations on salicin at the time. It seemed to me (for reasons which I need not stay to give here) that salicin was a very suitable remedy for my ailment. I therefore took twenty grains every two hours. I took the first powder at eight in the morning, and continued to take it every two hours during the day. After the third dose I was quite sensible of feeling better; and when evening came, having taken in all 160 grains, my cold was gone—I felt quite well.

I took forty grains at bed time, and got up the next morning perfectly well. As a precautionary measure, I took the salicin in twenty grain doses four times a day for a couple of days. I did not use any other means to get rid of the cold, and did not even remain in the house.

I have frequently had such colds, but never got rid of one so quickly before.

Case II.—My little boy, aged six, had a bad coryza, with all the usual symptoms. He rose with it on him on the morning of the 6th May, 1876. I gave him eight grains of salicin every two hours; and by evening when I saw him again, having had six powders, (forty-eight grains) his cold was nearly gone. The next morning he was quite well.

Case III.—A young lady, aged twenty-two, had a bad cold in the head with the usual symptoms of fulness in the head, general misery, running at the nose, etc. She did nothing for it, and was convalescent in a week or ten days.

Before she was quite well a younger sister, aged nineteen, with whom she slept, began to ail in the same way, general misery, frontal fulness and headache, sneezing, watering of eyes, etc. As this girl had some delicacy of chest I was asked to see her, I found the symptoms as above described, temperature 98·6, pulse 76, tongue clean, bowels regular.

I ordered fifteen grains of salicin every hour till three powders were taken, and then one every two hours. That was on the 22nd February, 1877.

On the 23rd I find the following note in my case book:—"Feels quite well, cold all gone, not a trace of it remaining, has had eight powders, 120 grains in all: to have a powder three times a day. Says she has frequently had such colds, and that they generally last for a week or more."

Case IV.—A young lady had had a bad cold in the head. While so suffering her mother slept with her. The young lady was under my charge for an ailment which required only an occasional visit. I happened to call on the morning on which the mother's cold appeared. She looked most thoroughly colded, eyes suffused and heavy, nose running, etc. She said she scarcely felt fit to be up, and begged me to do something for her, as she had to go out to dinner that evening. I prescribed fifteen grains of salicin every hour. This was between nine and ten in the morning. She took the powders as directed; said she felt better after taking three, and by the time that she left home for her friend's house was quite well, without even a trace of cold. That was after six powders, in all ninety grains of salicin had been taken. As a precautionary measure she took a powder with her, and swallowed it in her host's house. She spent a pleasant evening.

The next morning there was a return of her cold. She took fifteen grains of salicin every two hours, and by evening was quite well. She remained so, taking the medicine for a few days.

States that she frequently has such colds; that they generally last from a week to a fortnight, and that she never got rid of one so quickly as she threw off this last.

It is unnecessary for me to make any remarks. The details of the above cases speak for themselves. I would simply note that it is not every catarrh, but *cold in the head* that is benefited by salicin.

Since the above was written, I have had in my own person fresh evidence of the good effects of salicin.

On September 17th 1877, I was thoroughly colded before going to bed. On the morning of the 18th there was general malaise, a feeling of heaviness and fulness in the head, a sense of heat in the nostrils, sneezing with increased mucous flow, some tickling of throat, with slight huskiness and cough. I took 30 grains of salicin every two hours. In the evening, after having taken six powders (180 grains) felt quite well.

On the 19th with the exception of slight cough, I was quite free from cold.

On this day I had to go from home and had no salicin. On the 20th while still from home and unable to get salicin, the symptoms recurred. The fulness in the head, the sneezing, the general malaise, and the tickling of posterior nares were very troublesome. The day was warm but I felt cold and miserable: temperature 98·5. The sneezing and running at the nose were worse than on the 18th.

At 3 P.M. I took thirty grains of salicin, and took that quantity every hour. After the third dose I felt better; and after having taken six doses (180 grains) I went to bed feeling quite well.

On the 22nd I remained so, but took thirty grains of salicin three times a day both on that day and on the 23rd. Beyond a slight cough, which troubled for a few days, there was no other sign of cold.

The return of the symptoms on the 20th would probably have been prevented if I had had salicin on the 19th. In all cases in which salicin does good it is well to give it in large doses, and to go on with the remedy for a short time after the symptoms have disappeared.

In *acute lumbago* I have twice found speedy relief follow the administration of salicin in twenty-grain doses every hour. The local application of heat was also resorted to in these cases, and may have helped the cure; but my impression, and also that of my patients, was that the chief credit pertained to the salicin.

In two cases of *hay fever*, one treated by salicin, the other by salicylate of soda, each taken in the dose of twenty grains every two hours, relief was experienced while the drug was being taken; but the symptoms returned when it was omitted.

I give these short notes of different maladies, all of which are very common and very troublesome, and none of which is particularly amenable to treatment, in the hope that others may be led to try salicin in their management. The drug is a perfectly safe one, and may be given in large dose with impunity. It is so quickly eliminated from the system that its full beneficial action can only be got by giving it in frequently repeated dose. For an adult fifteen to thirty grains every hour is not too much where it is desired to get a speedy action.

It is a very pleasant bitter, and is best taken stirred up with about an ounce of water in a wine glass, a little syrup of orange being added for those who like it.

# ARE THERE LAWS OF THERAPEUTICS?

BY A. H. RABAGLIATI, M.A., M.D.,

*Surgeon to the Bradford Infirmary.*

(*Continued from* p. 173.)

## PART II.

SINCE the previous part of this paper was published, I have seen some remarkable corroborations of the truth of Proposition C., in which I think the reader will be interested. It will be remembered that Proposition C. asserts that the action of remedies on the human economy is not single, as is usually supposed, but at least twofold; the secondary being the contrary of the primary action. In a series of valuable observations on the "Influence of various Alkaloids on the Generation of Animal Heat," Dr. Bevan Lewis, of the West Riding Lunatic Asylum, bears striking testimony to the truth of the law. Thus the effects of Atropine are shown to be, *first* "dilatation of the arterioles," followed by a *second* period, in which the former conditions are entirely reversed," and in which we find "universal spasm of the capillaries." In the case of Solanine, Dr. Lewis finds that the injection of large doses produces a primary but very temporary fall, followed invariably by the gradual elevation of temperature." In the case of Hyoscyamine Dr. Lewis says, "An early primary effect of the alkaloid extending however only over a *short* interval is often observed. In this period the temperature may fall slightly," &c. He had previously said, "The administration of large doses is accompanied by a great thermic discharge, the calorimeter rapidly rising in temperature." His further remarks on the action of this alkaloid strikingly corroborate the statement made in the first part of this paper, that when the quantity administered is considerable, the *original* action escapes notice, because the *reaction* which soon succeeds lasts longer and cannot fail to attract attention. In the case of Strychnine, according to Dr. Lewis, there is a "temporary increase of thermogenesis, rapidly followed by a reversal of these conditions." About Picrotoxine he says, "The primary effect of administering a large dose appears to be the generation of an enormous amount of heat." "Then ensues a marked spasm of the capillaries, during which the heat production is reduced to minimum." Of Ergotine he says: "The results of my experiments rather tend to confirm the views of Brown-Séquard who insists on two periods in ergotine poisoning; first, vaso-motor spasm; secondly, vaso-motor paralysis." In the case of Chloral Dr. Lewis's statement is this: "a primary condition will be observed where there is an actual deficient heat production." And then "a great increase of heat formation ensues, accompanied by a large evolution also from the animal's temperature." If the reader has followed the above quotations, he will see that in a series of observations, undertaken to determine questions altogether apart from the consideration of this general law, the truth of the law is vindicated in the case of every one of the seven alkaloids experimented upon; the secondary action of each of them being the contrary of its own primary action. I do not know whether to be more surprised at the patient carefulness of Dr. Lewis's observations, or at the unexpected verification of the general law by the result of experiments which were not within my knowledge when I formulated it. These results bear out also, I venture to say, my previous statement that the Law of Similars may be phenomenally true, but is so only phenomenally. Had Dr. Lewis been less careful in his observations he would have said that chloral caused a great increase in heat-formation. Some medical practitioner would then have "discovered" that small doses of chloral lowered the temperature, and would have attributed the success of his treatment, which would doubtless follow, to the truth of the Law of Similars. He would, however, only have proved his own carelessness in not noticing that "both small and large doses of chloral have the double action, first of lowering and second of elevating the temperature; this twofold and contrary action being possessed by all remedies.

In searching histories of medicine for some indication that previous medical writers had perceived the bearing of the general law of therapeutic action which is here stated, I have not been able to discover much to the purpose. Boerhaave however seems to have had some glimpse of it, for he says: "Give a medicine whose *ultimate* action is curative of the cause of the disease, whatever its immediate action may be. If a hot drink produce perspiration in fever, then give a hot drink for that will cool the body, which is what we want to do. If the primary action of opium is constipating, and of rhubarb laxative, *and the secondary the reverse, according to the principle of reaction, then opium may be the remedy in constipation and rhubarb in diarrhœa.*"[1] It seems curious that this statement of the double and contrary action of remedies—of paramount importance in its application to treatment—should have dropped out of medical literature until it was partially revived in what appears to me so incomplete a form by Hahnemann nearly a hundred years later. To me it appears that successful treatment must be effected by *opposing* the diseased condition. If therefore we wish to summarize our mode of treatment, it is best stated in Boerhaave's fashion under the phrase "*contraria contrariis curantur.*" But there is nothing in this maxim which excludes our treatment of the secondary effect of an agent by the induction of its primary or opposite. Boerhaave's proposition above quoted is, according to Dr. Russell, the fifth distinct signification of the maxim "*contraria contrariis curantur.*" The first is that of Hippocrates, who said: we must produce an opposite condition of the body to that in which the disease occurred. If a man be too fat, he is to be made leaner; and if too lean, we must fatten him. The second is that of Galen, who said: disease arises from excess of moisture, dryness, heat or cold. Remedies are in their nature moist, dry, hot or cold. Give then, hot medicines in cold diseases, moist in dry, and so on, The third is that of Paracelsus (the prince of quacks), whose arcanum was a specific, or opposite of the disease, as the knife of cancer. The fourth was that of the the chemists, who ascribed diseases to an excess of acid or alkali in the blood, and founded their curative system on the neutralizing of this excess by giving an acid to an alkaline, and an alkaline to an acid.

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[1] *History and Heroes of Medicine.* By Dr. J. Rutherford Russell.

The remarks which I have made concerning proposition C., and even the general statement itself, are true, it should be observed, of causes acting for only a short time. Otherwise they are true of intermittent as opposed to persistent or continued actions. The effect of agents acting continuously is however curiously similar to that of those which act intermittently. The law of continuous actions appears to be this:—Causes acting continuously on the human organism manifest themselves in a series of activities separated by intervals of quiescence. An example or two will best illustrate this statement. A child swallows a halfpenny, which lodges over the larynx. What are the symptoms? Not, as might be supposed, continuous coughing until either death results or the foreign body is removed; but a series of fits of coughing separated by intervals of quiet, longer or shorter according to the irritability of the nervous system and the extent to which the larynx is occluded. In accordance with the same law it is that a child suffering from the continuous effects of the specific poison of whooping-cough, does not whoop continuously, but has fits of coughing separated by intervals of rest. For the same reason the growth of a cancer is not a continuous growth, but is made up of a series of wave-like aggravations and increase of the tumour, with succeeding periods during which the tumour diminishes in extent, and the fungating ulcer shows a tendency to heal. Similarly with the effects of pressure. Pressure continued for a short time follows law C., and induces first emptying of the capillaries with pallor of the part, and second congestion of the same with redness. Long continued pressure however induces recurrent paroxysms of pain, separated by intervals of comparative freedom from pain, the phenomena terminating in ulceration. Before leaving proposition C., I should like to draw attention to some facts which present some difficulty in their explanation, and which even seem at first sight to prove that the contrariety between the action of large and small doses is real and not only phenomenal. I think I can most shortly show this difficulty by first stating the phenomenal, as opposed to the real law, and then, by the consideration of examples, attempt to explain the puzzle. The following is the phenomenal law :—The increase and continuance of an action induces symptoms contrary to those caused by a smaller quantity of the same action. For example :—slight pressure upon a nerve induces either pain or irritation of the parts supplied by the nerve, while greater pressure induces insensibility or paralysis. A small quantity of alcohol excites while a larger quantity stupifies. And in the administration of chloroform, general nervous activity is first produced, while a larger quantity induces anæsthesia. I have chosen these examples because the explanation of the former set of phenomena seems to me to be different from that of the latter. The contrariety between the effects of a large and small amount of pressure is due to the intermediate occurrence of reaction. Pressure is essentially a lowering of vitality, and if carried far enough may actually destroy functional activity. But when it is carried only so far as to lower activity without destroying it, then in accordance with law C., reaction is set up, which induces for the time being heightened activity. Precisely analogous to this are the effects of cold. Exposure to very slight cold is followed by a slight glow of reaction. Somewhat longer exposure is followed by simple inflammation. Lastly, exposure to cold may be so prolonged, or the cold may be so severe as to kill outright. In the case of alcohol or chloroform the explanation is somewhat different. A small amount of alcohol paralyses to some extent the vaso-motor system ; the increased blood supply thereby induced heightens nervous activity. A greater amount of paralysis causes stasis, the blood parts with its nutrient material, and the nervous tissue, poisoned by the effete blood, ceases its activity. The reaction in this case follows later, manifesting itself in the headache and other discomfort succeeding a debauch, or in the secondary effects of chloroform which so frequently baffle the surgeon's skill.

The fourth therapeutic law which I have to state is the following :

D. Different quantities of different but similarly acting remedies are required to produce given effects upon bodies of equal resistance.

The truth of this is almost self-evident. Very small quantities of tartar emetic induce effects as powerful as those caused by very much larger doses of ipecacuhana. A large quantity of castor oil has no more effect than a drop or two of croton oil, and so on. This law introduces us into the question of Posology, a much debated one in recent times. The determination of what quantity of a remedy is required to act upon a diseased organism is effected by the resistance of the organism, and something, as yet unknown, in the constitution of the remedy. There are no signs that this latter factor will soon be determined, or that we shall be able to offer any other explanation of it than that it is an ultimate fact. As regards resistance, I should like to remind the reader that this is a constantly varying factor, not only in different individuals, which is almost self-evident, but in the same individual in different conditions. It is well known that a very small amount of cold may set up inflammatory action in a fatigued person, while in his ordinary state it may be only sufficient to produce a comfortable after-glow. Speaking generally the diseased organism is more susceptible than the healthy to remedial agencies, nor is this remarkable when its weakened condition and exalted sensibility are considered. In this state therefore a quantity of a remedy may have a decided effect, which would have been quite inadequate to affect the healthy body. I am inclined to think moreover that the exciting circumstances in which we are now living still further heighten the susceptibility. I should offer these explanations among others of the fact that some writers recommend the administration of quantities which would have been thought absurdly small twenty years ago. I cannot see that there is any other sound method of determining how small a dose may affect a diseased organism than by making the experiment. No *a priori* considerations seem to me sufficient to settle the question. In order that the experiment may be valid, two conditions must be fulfilled. First, we must be familiar with the natural history of the disease in question: second, we must be certain that we are actually administering the remedy. The almost infinite differences that exist in different constitutions, and the divers modes in which they will therefore be affected by similar causes, will always offer most serious obstacles to the thorough mastery of the former of these requisites, and will, I imagine, always therefore leave room for differences of opinion regarding the modifying causes of disease. No doubt a man who, looking on at the course of certain processes, boldly declares that but for the administration of his remedies, the course would have been different, incurs some risk of rashness in statement. On the whole, however, such a judgment may reasonably be demanded from a medical man, and the value of his judgment will depend on his skill and experience. As regards the administration of remedies, if a solution said to contain a remedy responds to its chemical reagents, and if on administering it we find the therapeutical effect expected, we may be certain that our drug has been administered. The mere occurrence of so-called therapeutical phenomena, after the administration of a solution from which the former test was absent, may fairly be rejected as proof of therapeutic effect.

The last proposition which I shall state is this:

E. The time after which reaction succeeds action is different in the case of different remedies and of differently constituted bodies, and this also must be determined by experiment. Unfortunately I have not many observations to make on this proposition. Why do we order iron or quinine to be taken three times a day? I wish I could answer: because careful experiment has shown the effect of one dose to pass off in about six hours. Practically most of us order it at these intervals because other men have done so before us, though I must say I think the general custom a wise one. It is so probably because these remedies are administered to remedy chronic conditions, in the cure of which time counts for much. In acute conditions we desire more rapid effects, and hence our remedies are administered at shorter intervals. In the early stages of pure inflammation aconite may be administered at ten or fifteen minutes interval with great advantage. In the present state of our knowledge all that we are warranted in saying is, I think, this: in chronic complaints medicines should be administered at longer intervals, while in acute diseases they should be given at shorter intervals.

These seem to me to be all Laws of Nature in this particular department of science. Evidently their application is susceptible of almost infinite detail, and the unworked field is both immense in extent and promises the richest fruit. In particular we still require to find a standard of Resistance in the field of drug action, before we can state our results with scientific accuracy. The law of the conservation of energy would seem to demand that this be effected by the comparison of drug actions with the effects of heat and cold, as these last can be put at once into foot pounds. My suggestion would be to institute a comparison between the effects of such a drug as digitalis in lowering the heart's action, and the amount of cold required to produce the same effect. This investigation I am convinced would well repay inquiry. When these laws are recognised, and this standard agreed upon, the practice of Medicine will be founded on a scientific basis. Law and order will take the place of empiricism and eclecticism. Thus the physician who is called upon to treat an unknown affection, after inquiring what is the part affected and what are the causes of that affection, will administer remedies having selective affinities for the affected part, in quantities inversely as the resistance of the patient, and at such intervals as previous experiment shall have shown him is the time required in the particular instance for reaction to succeed action.

# SOLID FOOD IN TYPHOID FEVER.

BY SAMUEL D. TURNEY,

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All authors I believe unite in condemning the use of solid food during the course of typhoid fever, or in the earlier stages of convalescence from this disease.

They point out many dangers from its use—indigestion, muco-enteritis, aggravated diarrhœa, hæmorrhage, and perforation of the bowels.

Twenty-five years ago they were yet more rigid in their dietetics than they are to-day, giving their patients only solutions of gum, watery broths, or very dilute preparations of farinaceous food.

Early in my practice I was struck with the similarity between many of the symptoms of the later stages of grave typhoid fever and the effects of imperfect nutrition. I was led to believe that a sick man might be starved to death, and that some of the deaths attributed to this disease might be due to destruction of organs from unsupplied waste of tissue—that is, from a process of slow starvation. A more liberal use of nutritious fluid food, rich soups, beef-tea, egg-nogg, and milk; by the greater mildness of the symptoms, the shorter continuance of the disease, and the increased number of recoveries confirmed me in this belief.

Over twenty years ago I somewhere met a brief allusion to the value of solid food in typhoid fever by Dr. Hooker of Connecticut, now deceased.

It was a mere hint embedded in some article not strictly relating to this subject, and from the universal silence of the profession, it seems to have fallen unheeded. I am unable now to find the original publication, but his idea, as elaborated by myself, is this. As early in the disease as possible, before the stomach has lost its digestive power, the patient is to be given a substantial diet of plain solid food, such as beef, mutton, roast potatoes, and toast three times a day at his usual hours of eating.

The food should be well prepared and made as appetizing as possible. Little or no fluid is to be used during the meal. Notwithstanding the loss of appetite and aversion to food, the patient is urged to eat, if only a few mouthfuls. The habit of eating is to be kept up. In the course of three or four days the loathing ceases, the patient readily takes food and frequently anticipates his meals with pleasure, and enjoys them with positive relish. *Pari passu*, the gravity of the symptoms subsides and the disease, running a mild and regular course, the patient convalesces at the end of the third week with scarcely any other therapeutic means.

As this was but an advance upon the line of my treatment, and as my own reasoning and observation had brought me almost to the same point, I adopted the practice; and after an experience of more than twenty years, I think I can safely say that the dangers of solid food in typhoid fever are exaggerated or fanciful, and that there is no method of treatment of this disease, at least as it occurs in private practice, so satisfactory to the physician and so successful in result as this of Dr. Hooker's.

Contrary to the established belief, my experience teaches me that solid food in this disease is never an irritant. That it does not increase fever nor cause indigestion, gastro-enteritis, aggravated diarrhœa, ulceration of Peyer's glands, hæmorrhage, or perforation of the bowels. So far from this, solid food, when properly administered, is thoroughly and easily digested, and is a preventive of these accidents. I have every reason to believe that the irritation of Peyer's plates stops short of ulceration under its use.

In regard to the digestion and assimilation of the food I cannot be mistaken. In the many cases in which I have pursued this method, the food has in no instance been rejected by the stomach, the diarrhœa has ceased, and the fæcal discharges have become regular, semi-solid, and have borne all the characteristic appearances of healthy fæces. The food must then have been digested, absorbed, assimilated, subserved the purposes of the economy, gone through the various stages of retrograde metamorphosis, and appeared at last in the excreta.

No one can fail to see the importance of thus maintaining the integrity and physiological activity of the digestive organs. The habitual secretion and subsequent resorption of pounds of saliva, bile, gastric, pancreatic, and intestinal juices, cannot be abruptly arrested without injuriously disturbing the whole animal economy. Such arrest must be a predisposing cause of local congestion and of vitiated secretions, which directly or indirectly aggravate already existing irritations and increase the danger of ulceration, hæmorrhage, and perforation.

The use of solid food alone will maintain these functions in their full physiological vigour. A mistake is made in looking upon fluid foods as more digestible than solid. Solution and digestion are not equivalents. Digestion is a vito-chemical process, the result of the reaction of the various digestive juices of the elementary tract upon the food.

For the secretion of these juices the act of mastication or of suction and the rough contact of the semi-solid mass with the secreting surfaces are necessary.

This *roughness* is also necessary to excite the rhythmic movements of the stomach and intestines, a movement essential to sound digestion and absorption. When fluid food, which is but the physical separation of the nutritive particles, and their distribution through a solvent, is exclusively relied on, the secretion of the saliva and other digestive juices is imperfect and there is no sufficient stimulus to the muscular walls of the intestines. The solvent is taken up by the veins and the undigested pasty residue suffers unhealthy fermentations, and becomes a source of irritation.

Experience and reason both, then, teach that the regular use of solid food in typhoid fever best preserves the integrity of the digestive functions, prevents local congestions of the chylo-poietic viscera, saves the irritation of vitiated secretion and unhealthy fermentation, enriches the blood, and restores tissue disintegration.

It is impossible to over-estimate the advantage to the patient of this constant supply of assimilable nutriment and the consequent maintenance of the integrity of the various organs, and especially those organs whose functional activity is necessary to eliminate the poisonous results of retrograde metamorphosis.

It places the whole system in the most favourable condition for resisting the destructive attacks of the fever, and supports and sustains until this self-limited disease has run through the various stages to its ordinary termination in health.

I do not wish it to be understood that solid food is to be relied on to the entire exclusion of any other therapeutic means. It is only the essential factor in the treatment. At the outset quinine in liberal doses clears up the diagnosis and moderates the intensity of the fever. Opium is indicated to relieve pain, to give rest, and to control excessive diarrhœa. In grave cases a mixture of chlorate of potass and iron is a valuable tonic and hæmatic.

But in ordinary cases the indications for medicinal interference almost entirely cease by the middle of the second week. As a rule by this time the appetite has returned, the diarrhœa has ceased, the fever has moderated, and the patient, if delirious, is restored to reason.

It is difficult to make a just comparison of different modes of treatment of disease, as the varying gravity of the affection and the surroundings of the patient very materially affect results. But I am convinced that the mortality in this method of treating typhoid fever will compare favourably with any other. Not more than one case in twenty-two in an aggregate of nearly 200 cases has died.

The method of Brande has in some hands shown as good a result. But aside from the fact that his method is still upon trial—and some reports are very far from being as satisfactory as those of Wunderlich and other advocates of the hydropathic treatment—his method, however suitable it may be in hospitals, can never be made generally available in private practice from want of proper facilities, and difficulty in procuring skilled attendants.

But there is nothing incompatible in the two methods; and in exceptional cases, when the increased temperature becomes a source of danger, the food treatment can be supplemented, if deemed necessary, by the cold bath. With the use of solid food the fever generally terminates exactly on the twenty-first day, ordinarily shading off from the end of the first week until the thermometer at that time indicates no increase of temperature.

Full convalescence is prompt, as the patient is not emaciated and exhausted by excessive wasting discharges. In no instance in my experience has death come from diarrhœa, hæmorrhage, or perforation of the bowels, and this alone I think is conclusive evidence that solid food is not an irritant in typhoid fever.

The success of this treatment will depend much upon the character and faithfulness of the attending physician.

He must have a clear appreciation of its value, and early in the disease he must be able to impress its importance upon the patients and his attendants.

There must be no evasiveness, no broad latitude, no "about" in his directions in regard to quantity and mode of taking food.

The directions must be precise and full, and he must insist upon a strict compliance with his orders. It is much easier to dose the sick man with drugs than to overcome his loathing of food, and for the first few days it will require all the authority of the physician to induce him to eat. But restoration of the appetite comes with the end of the week, and the dangers and the difficulty are then over.

As this mode of treatment to a certain extent requires the intelligent consent of the patient, it is not so applicable to young children as to adults. They cannot readily be induced to eat.

It is in this class of persons therefore that in my experience the disease ordinarily assumes its graver forms. Not that the mortality is larger; for the restorative powers of youth are greater than in advanced life, but the unpleasant symptoms are more pronounced, and the disease runs a more irregular and indefinite course.

It is in these cases that milk has a peculiar value. Milk is often classed among the fluid foods, but as it coagulates and assumes a semi-solid consistence in the stomach, it does not properly belong to this class. It would probably be equally as efficient in the treatment of typhoid fever with the more solid food if, in the act of taking it, it required mastication, and if the residue more actively excited secretions and rhythmic movement. Being highly nutritious and containing all the elements of repair of tissue, it is an excellent addition to the more solid diet, and can with advantage be combined with this in the adult, especially when the patient's appetite has returned.

But milk alone cannot take the place of solid food.

# ON THE INFLUENCE OF SEA-VOYAGES ON THE HUMAN BODY, AND THEIR VALUE IN THE TREATMENT OF CONSUMPTION.

BY C. FABER, M.D., OF STUTTGART,

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(*Continued from* p. 277.)

## VI.—On the Choice of the Sea-Route and the Vessel best Suited for Therapeutical Purposes, with Practical Hints Regarding the Outfit of an Invalid, his Accommodation, and Life on Board.

### 1. *On Sea-routes.*

The principal sea-routes for consumptive invalids, which, taking climate and opportunities of conveyance into consideration, I either know or can at all think of, are these—to Australia, to the Cape Colony, and to the West Indies. A trip to the United States or to Canada would, in respect to climate, be very suitable during the summer season, but it is too short. When the invalid is just getting acclimatized to sea-life, or even whilst he is still prostrated by sea-sickness, the trip is at an end. The other routes I have mentioned go either into, or right through the tropics. The voyage to the West Indies also is only a short trip, taking little more than a fortnight by mail-steamer from Southampton. I do not know of any sailing line fit to carry invalids there; otherwise I should certainly give it the preference over the mail-steamers.

It is evident from what has been said in previous chapters that the passage through the tropics is a most serious thing for a consumptive invalid—it may cost him his life. But I do not see how it can well be avoided if he is to make a long sea-voyage for his health. There are two reasons for this. Firstly, there is in the northern hemisphere no stretch of ocean large enough for our purpose, which requires, as has been shown in my last paper, a voyage of about sixty days. Secondly, an invalid has to cross the equator to the southern hemisphere, in order to avoid our winter and enjoy summer in its stead. Of course there are in our hemisphere seas that, without being tropical, would offer to an invalid a most delightful and beneficial winter cruise—such as the southern parts of the Mediterranean and the North Atlantic between the latitudes of Madeira and the Canaries. But very few invalids have either the means or the enterprise for such an undertaking. Thus, only two regular routes remain, the one to Australia, the other to South Africa. The latter is rather short—lasting something less than four weeks in a steamer. If there were a good line of sailing vessels fit to carry invalids, the duration of the voyage—about sixty days—would be just right, but I neither know, nor have ever heard of, such a line. This route also keeps within the most genial latitudes and does not go up to such high ones as sailing vessels bound for Australia usually do. But, on the other hand, an invalid on the voyage to the Cape only, would miss the fresh, eminently bracing and invigorating climate, of those high southern latitudes, which I have described in the first chapter.

The voyage to Australia certainly often proves of a trying length, even when the maximum figures put down for sailing vessels by the Passengers Act, 26 and 27 Vict., cap. 51, sect. 30—namely, 120 days to Western Australia, 140 days to any other of the Australian colonies, 150 days to New Zealand—are not nearly reached, a voyage of 75 to 80 days to Victoria, one of from 85 to 90 to New Zealand, being now-a-days considered a fair average passage. The quickest passage on record by a sailing vessel to Victoria was, if I remember rightly, made in 61 days; the quickest passage by a steamer—*viâ* Cape of Good Hope—made in 1875, was 45½ days. "Mixed steamers," a term which will be explained further on, take about 60 days.

The climatic character of these two sea-routes, to South Africa, and further on to Australia, has been spoken of at length in the first chapter. The suitability of either country of destination for therapeutical purposes will be compared in the next one.

The return voyage from the Cape is generally made by the same route. If a patient, however, should be bent upon enjoying sea-life for a greater, and yet not too great a length of time, I should recommend him first to cross the South Indian Ocean to Australia, and there to break the voyage for some weeks, or months. Next cross the Pacific to California, and again stay for some time in that beautiful climate.[1] Lastly, with some intermediate stoppages for the sake of rest, cross the North American continent by rail and the North Atlantic from New York, thus completing the voyage round the world.

Whilst for the outward voyage to Australia I should always recommend the route round the Cape of Good Hope, either with a stay there, or direct, for the *homeward* voyage the invalid may choose from three routes. The one just sketched out, *viâ* San Francisco and New York, is by no means the worst of them. The invalid is, however, here supposed to have picked up sufficient strength during the preceding voyages to stand the rather fatiguing journey over 3,000 miles of the American continent, without injury to his health. To avoid this long land journey, one might think of taking the sea-route from San Francisco to Europe, which is only interrupted by a very short railway journey across the Isthmus of Panama. But there again, tropical seas, and of the very hottest description, have to be passed.

The second route I can recommend to an invalid for returning home from Australia is the same way back, viz., round the Cape of Good Hope. Here one has the choice between sail and steam. Homeward-bound steamers generally take this route, excepting the mail-steamers belonging to the Peninsular and Oriental Steam Navigation Company, which go to Ceylon, where passengers and goods are transshipped *en route* for England *viâ* the Suez Canal. "Mixed" steamers, however, sometimes go round Cape Horn. As a rule, sailing vessels from South Australia (Adelaide) also take the route round the Cape of Good Hope, whilst it is the exception for those from Victoria (Melbourne) or New South Wales (Sydney) to take this route instead of that round Cape Horn. In the southern oceans westerly winds prevail nearly throughout the year; it is only during the first months of the year, that a fine wind may blow from the east, and make the captain of a ship bound homeward from these last-named colonies decide upon the westerly route.

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[1] By the way, the line of mail-steamers from Sydney to San Francisco did not, at the time of my stay in Australia, in 1875, have a particularly good reputation for comfort and general character.

Under no circumstances should I recommend the route from Australia to England round Cape Horn to an invalid. To enforce this warning I need only refer to what has been said in the first chapter of the climate of the South Pacific in the high latitudes which a ship has to make for in order to double Cape Horn—and to the fact that a homeward voyage of 100 days is considered a fair average one in a sailing vessel taking that route. My last ship was by no means a slow one; it could show passages to and from Australia as quick as almost any other ship, yet the homeward passage I made in her round Cape Horn lasted nearly four months, in consequence of unfavourable winds, and still more of tropical and sub-tropical calms—too much of a good thing for the body and mind, even of one whose love of the sea seemed to be of the most constant and inexhaustible character.

The third homeward route from Australia lies through the Suez Canal by one of the Australian mail-steamers. Although the Red Sea is noted for its excessive heat almost all the year round, and therefore also in the season when an invalid is supposed to be returning home, yet that heat, expressed in thermometrical figures, looks far more frightful than it really is. In the Red Sea, lying between two vast sandy deserts, the Libyan and the Arabian, the heat is comparatively dry, and may therefore be even less oppressive than a considerably lower temperature in mid-ocean, say in the equatorial doldrums. Besides, the passage through the Red Sea only takes about five days, and there is always some cooling draught on board a fast steamer.

The best *season* for an invalid to sail from England is the beginning of October; for returning home it is the end of May, or beginning of June. Within this period the whole voyage on the routes mentioned, including the stoppages on land, may be done with comfort and ease.

### 2. *On the Choice of the Vessel.*

The first question is—*sailing vessel or steamer:* which of the two is best for therapeutical purposes? I find that most physicians prefer for their patients the former class of vessels, and not without good reasons, which, however, appear to be based rather on theoretical considerations than on practical experience.

Above all, the air on the open deck of a sailing vessel is, generally speaking, purer than that of a steamer. It must however, be remembered (see Chapter II.) that there is on board every high-class sailing vessel a small steam-engine for distilling water, the smoke and dust of which sometimes makes itself perceptible in a most unpleasant manner. Still, that is nothing compared with the volumes of smoke and black dust the huge engines of a powerful steamer send forth. Besides, the donkey-engine of a sailing vessel is not always at work, and the smoke from it does not so frequently blow right aft as in a steamer, for the sailing vessel is unable to face a direct head-wind, and the smoke consequently is usually blown over the side. There is, however, as a rule, even on a steamer, one side at least of the quarter-deck free from smoke, and the fore-part of the ship is always free. I remember, on my first voyage, in a mail-steamer, not being molested by any smoke on the quarter-deck for many days together.

Nor do I attribute any very injurious influence to smoke, as long as the air is pure in other respects, which will be the case on a steamer just as on a sailing vessel. The atmosphere of London is more impregnated with smoke and coal-dust than that of any other European capital. Yet its mortality rate is lower than that of any other.

Whilst thus, as regards purity of the air *on deck*, the difference between the two classes—steamer and sailing vessel—is not so great and important from a sanitary point of view as many are inclined to think, the air *of the interior* of the vessel presents more decided disadvantages on the part of the steamer.

First of all, it is hotter, as the whole of the heat produced by the combustion of so many tons of coal a day, is not converted into motion or given off through the funnel, but part of it permeates the ship, together with greasy, butyric smells from the engine, of a nature more or less offensive and sickening.

The same greasy, fœtid substances, along with saline matter, from the engine, pollute the bilge-water, making it still more offensive than it would otherwise be.

The air in a steamer being not only hotter, but also moister than in a sailing vessel, fermentation, or what in this case is the same, putrefaction, of the bilge-water, as well as of such parts of the structure, the provisions, and the cargo of the ship as are liable to it, is much more favoured in a steamer than in a sailing vessel.

This condition of the air of the interior of a steamer cannot fail to influence the health of the people on board, and that certainly not in a favourable way. The warm, moist, and polluted atmosphere, especially of the lower parts of the vessel, must, to say the least, have a debilitating effect upon their constitution. It will, however, be shown presently how the substitution iron for wood in shipbuilding, has, to a great extent, lessened the drawbacks above mentioned.

Another important point which tends to render the air in steamers less pure, or, to speak more correctly, more impure, than in sailing vessels, is the overcrowding, for which there are several reasons. Firstly, much room is taken up by the engines and coal-bunkers. The space saved by a smaller complement being required for navigating a steamer, is filled up, or even more than that, by the engine-room staff, engineers, stokers, &c. The rates of freight being higher in a steamer than in a sailing vessel, as much as possible of the room left by the engine and its dependencies is used for stowing cargo. Moreover, the great cost of steam, as compared with sailing, makes the owners of steamships economise the room left for passenger accommodation much more than is done in high class sailing vessels, where, indeed, I have often found a liberality in allowance of cubic space for each passenger which deserves to be acknowledged. Altogether, space is much more valuable in a steamer, than in a sailing vessel.

Another disadvantage in a steamer at sea which, however, is not nearly so much felt by healthy people as it often is by weak or irritable invalids, consists in the vibration produced by the action of the engine, and by the steam in the boilers, as well as the noise from the same source which it may cost an invalid much exertion to overcome when talking; and last—not least—the greater and more violent motion of a steamer as compared with the soft gliding of a sailing vessel. After one has, however, paid the first tribute to it in the shape of sea-sickness, probably more violent and of somewhat longer duration, one becomes so much accustomed to the motion and noise that I myself, for instance, on my voyage to South America, soon got to like the rhythmic noise of the engine, and the accompanying rocking forward and backward, upward and downward of the vessel, and found it a good soporific, lulling me quickly into sleep. After some time I did not sleep so well when the engine was at rest.

Another circumstance, unfavourable to invalids, and connected with the forward pushing motion of a steamer, is the more frequent shipping of high or "green" seas in rough weather, the steamer being able to go, and often going, against a head wind and through a head sea while a sailing vessel would not. Invalids may, therefore, have to retreat down stairs more often, and keep within close quarters for a greater length of time, on a steamer than on a sailing vessel. Moreover, the chances of one's cabin getting flooded are decidedly greater in a steamer. This is an accident of no slight import to an invalid with a disposition to catch fresh colds, as the cabin may not get dry again for days, the ventilation being, in rough weather, still much more defective than usual, and the air being more humid. For this reason, as well as for the greater quiet, and the somewhat less fare, I have seen invalids prefer a cabin on the main-deck, which is better protected from the invasion of sea-water, to one in the poop, which is far better ventilated, and altogether more comfortable and cheerful looking.

As regards accommodation, room, light, and air inside, a high-class *sailing vessel* is *decidedly superior* to a steamer, where, as we have seen, those comforts, which are of the greatest importance to an invalid, are economised as much as possible.

Against the drawbacks of a steamer just enumerated, there are, on the other hand, advantages which, in my opinion, to a great extent counterbalance the former. In the case of a steamer one can foretell the duration even of a long sea-voyage to within a few days. One is, therefore, pretty safe against running short of provisions, as well as of patience and good spirits.

Of the greatest importance to the invalid is the quick passage of a steamer through the tropics, and particularly through the zone of the equatorial doldrums, in which sailing vessels not unfrequently are detained for weeks.

The construction of the vessel *of wood or of iron* constitutes another important difference. The advantages and drawbacks of either construction also require due consideration on the part of intending invalid passengers and of their medical advisers. I may, however, be allowed to premise that, in my opinion, the advantages of an iron vessel are so great as to make it from a sanitary point of view unquestionably superior to a wooden structure.

The latter, it must be owned, has a more equable, if not to say a temperature of its own, at least to a certain extent. The temperature of the interior of an iron ship is much more easily transmitted to the surrounding *media*, viz. air and water, and *vice versâ*; it, therefore, will be hotter in tropical, colder in polar seas; it will be much more subject to great and sudden changes than that of a wooden vessel.

If the surrounding *media* are of a lower temperature than the air within the ship, a certain amount of moisture precipitates on the side of the cooled iron walls, which consequently are almost always found dripping wet.

An iron structure naturally has a much greater resonance all through than a wooden one. Hammering, knocking, footsteps, &c., will be heard much louder and at a greater distance in an iron ship—not an unimportant point to nervous invalids.

Whether and how far the health of the people on board an iron ship is influenced by the magnetic and galvanic currents this construction gives rise to, is a question on which I shall not enter.

The one great and even paramount advantage of the iron construction is the better condition of the bilge-water, that great factor in the salubrity of a ship. In iron vessels the bilges can be much more easily and thoroughly cleansed than in wooden ones. An iron ship's bottom is much less apt to let sea-water in. Iron does not rot like wood, nor does it become a receptacle and hotbed of disease germs.

As to particular *lines of vessels to Australia*, I do not expect an invalid to have any special preference for emigrant ships, though they are generally fine vessels, and their cabin and saloon accommodation, as well as their bill of fare, is not inferior to those in other sailing vessels. The number of first-class passengers is, however, very limited, and the poop deck, the place for recreation and exercise in the open air reserved for first class passengers, is proportionately short.

Among the private passenger sailing lines to Australia which I know from personal experience—and I have inspected ships of almost every one of them—the best one is Messrs. Green's Blackwall Line of Packets for Port Philip (Melbourne), London. Without paying a higher fare than in other lines one has here most spacious cabins for two passengers only, a liberality which is of the greatest value in a therapeutical respect. Beside first-class passengers, only a small number of second and third class passengers are taken; so there is no fear of any of their ships being crowded with steerage passengers. After what has been said from official statistics regarding the influence of such crowding on the mortality in ships, an invalid will know how to act upon this hint. Messrs. Green's vessels are of first-rate sea-going qualities, and having formerly been in the East India trade, they belong to that class of commodious frigate-built vessels which old East India men so well remember before the opening of the Suez Canal had caused the route round the Cape to fall into disuse. Compared with the latest clipper-built vessels, they have the advantage of having a much more spacious, and especially a wider, poop, and a more comfortable motion, whilst the former, from their extremely narrow beam, are given a good deal to rolling and the shipping of large seas. Another objection to choosing a clipper for the voyage to Australia is the circumstance that they usually go very far south —the "great circle route" lying even south of Kerguelen Islands. Fine clipper lines from London are Thompson's Aberdeen Clipper Line, and Anderson Anderson's Orient Line. Also from Liverpool and Glasgow—Loch Line—one has the choice among several good lines of sailing vessels.

Of steamers to Australia, round the Cape of Good Hope, there are two classes, mixed steamers, as I have called them above, and regular first-class steamers. The former, represented by Money Wigram's Line from London, and the Liverpool and Australian Navigation Company's Colonial Line of Australian Packets, are old-fashioned, weather-beaten vessels, of moderate size and steam-power. I call them "mixed" steamers because steam is dispensed with when the wind is favourable and strong enough. One of these steamers, however, which arrived during my stay at Melbourne, had only done so for sixteen days altogether during a voyage of about sixty days. These steamers make their return voyage either the same way back, round the Cape of Good Hope, or round Cape Horn. The accommodation, bill of fare, the class of passengers, and the social life on board are very much like those on board that class of sailing vessels recommended above.

Recently a new line of large (3,600 tons), powerful steamers has been started from London, called the Colonial Line of Packets. They go under full steam the whole way round the Cape and the same way back, calling each time at Cape Town and one of the Cape Verde Islands. The first of these steamers made the voyage in something like forty-five days, during which time £2,000 worth of coal is said to have been consumed. *A priori,* I should not recommend them for a therapeutical purpose, and I am still less inclined to do so after having inspected one of them. The following are my principal objections to them: the too great speed; the economising of the space to such an extent that the cabins, at least those I have seen, are too small to keep even a single trunk with the things for immediate use in them; the crowd of cabin-passengers, up to one hundred and more, which precludes that quiet sort of family life which often unites the company in a smaller vessel and makes the long voyage cheerful to an invalid.

In *choosing* a *particular vessel,* the class in which she is registered at Lloyd's, her age, her tonnage, which should not be less than 1,000, her construction of wood or iron, the length of her poop-deck, the size, light, and ventilation of her cabins, the existence of bath-rooms, the number and social class of the passengers, the professional, and still more the personal, character of the master, the scale of diet, whether known to be liberal and varied, or scanty and monotonous, &c., &c., should be taken into consideration.

Only one point I wish once more to impress particularly upon invalids engaged in choosing a vessel or on their friends, especially their medical advisers acting for them, namely, the paramount necessity of a sufficient supply of fresh air within the ship. To insure this not only must a spacious, well-ventilated, and well-lighted cabin be provided, but also the lower parts of the vessel should be examined, especially as to any emanations from the bilge-water and from the cargo. Such an examination in port does not, however, give much security for the bilge-water and cargo to keep in a sweet condition. The bilges have been cleansed in port—at sea I have never seen or heard of their being so. Moreover, in cold weather, or temperate climates in general, there may be no smell, or scarcely any, whilst in the tropics it becomes most abominable. In this respect certain cargoes, Australian or South American wool and hides, for instance, are almost as bad as the bilge-water, and are, moreover, nearer the inhabited parts of the ship.

### 3. *On the Outfit of an Invalid, the Accommodation and Life on Board.*

Having fixed on a particular vessel, an invalid should have a *cabin* engaged as early as possible, so as to have a good choice. For the outward voyage a cabin on the port side is to be preferred, as in the hot weather the wind—north-east and south-east trade—as long as there is any, will come from that side, and thus make the heat in the cabin less oppressive. Besides, the starboard side of a vessel, particularly in an iron ship, bound for the Cape or Australia, remains hotter at night, the tropical sun heating that side to the very last. The more amidships the cabin is, the less the motion of the vessel makes itself felt.

If an invalid can afford it, and has no companion or nurse with him, I should strongly recommend him to engage a cabin to himself, which, taking the single first class fare at fifty guineas, as it is fixed in Green's ships, for instance, would only cost him some twenty guineas extra. Supposing there to be two bunks only, as is the case in that line, the one along the partition from the saloon or the passage, the other along the wall of the ship, an invalid had better occupy the inside one, so as to be able to leave the window open all night without being too near the draught, or being liable to be wetted by the occasional invasion of a wave through the window. Nor is the roaring of the waves outside heard so much in the inside bunk as with one's ear to the side of the ship.

In sailing vessels, as a rule, the general *out-fit of the cabin* is not provided by the owners, with the exception of an empty bunk and a washing-stand, but has to be found by the passenger. I shall not enumerate all the things wanted for this case, but only such of them as have some particular value to an invalid.

I do not think a swinging bedstead belongs to this category, but rather expect it to prove a failure, as did the swinging saloon of the Bessemer steamers.

For a bed, one with springs and horsehair mattress above is the best and most comfortable. I should particularly warn an invalid against a mattress filled with wool, or rather cotton wool, which, in the humid sea-air, soon gets damp. Thus an invalid may, in his very bed, catch a cold of which he may not get rid of as long as he sleeps on that mattress.

A great comfort, particularly to an invalid, is a folding arm-chair, in which, in the warm climate, one sits on deck during the best part of the day. In the cabin a chest of drawers will be found very useful, saving an invalid a good deal of exertion in moving and searching through trunks and boxes. In the same way swinging trays, book-shelves, and similar fixtures are very handy. Curtains and venetians at the window and the door, as well as a carpet on the floor, will assist materially in giving a comfortable and homely look to the cabin, a consideration of no small importance to an invalid sent away from home to the antipodes.

I should also strongly recommend the invalid passenger to take a sponge bath with him. A regular douche apparatus may complete the furniture of the cabin.

As to *clothing*, an invalid must, for an Australian voyage, be provided with all sorts of clothes, from the lightest summer habit to good stout winter clothes, including a warm great-coat. The same applies to the covering for the head. Within a few weeks the straw-hat may have to give place to the fur cap. In the hot weather white shoes, made of sail-cloth, are most convenient, being much lighter, and allowing of a freer perspiration than leather shoes. For facing wet weather on deck, a sou'-wester, a stout water-proof, and goloshes are indispensable.

A large stock of linen and of underclothing is required to hold out for the whole voyage, there being no opportunity on board, or only a very bad one, of having one's things washed. The dirty clothes bag, therefore, will swell to a considerable volume, and as it is usually kept in the cabin it should shut tight, and its contents should be disinfected each time something is put in by sprinkling a little diluted carbolic acid over them. An invalid should always wear flannel next the skin. In the heat of the tropics the temptation to leave it off is very great indeed; but by doing so an invalid is almost sure to catch a fresh cold, if nothing worse. In the tropics themselves flannel or merino is the best thing to wear, as it readily imbibes the profuse perspiration which the body is otherwise streaming with. For this reason I have found the residents in tropical countries wear flannel next the skin even in the hottest season.

A private stock of certain *eatables* and *drinkables* will prove a great comfort to the invalid. The chief ones are fresh fruit, the ship's stock of which often runs short; some pots of preserved milk and of Liebig's extract of meat, a number of bottles of effervescent citrate of magnesia—the acid of Seidlitz powders will melt away in the tropics—lastly, a stock of good genuine Burgundy and claret, the latter for the hot climate. The wines from the pantry are either of indifferent or of detestable quality, whilst beers and spirits, as a rule, cannot be called bad.

As regards the *mode of life* on board and the precautions an invalid has to observe, a good many hints will be found in the first chapter, on sea-climate; in the second, on sea-hygiene; and in the fourth, on the physiology and pathology of sea-life. In this place I should like to impress upon the minds of invalids only one general point which is of the greatest importance for a satisfactory result of the thalasso-climatic as of any other mode of climatic treatment, viz., *the necessity of observing the strictest régime.* It is an error which is as common as it is serious, to believe that the climate they are sent to for their health is to do everything towards their recovery, and they, therefore, may live as they like under the health-giving sky. By this belief many an invalid is led into a loose life—I do not mean this in a moral, but in a therapeutical sense—which will prove the more injurious the stricter the *régime* has been to which the invalid has been kept at home. But for this reason many cases of climatic treatment would give a most satisfactory result, in which the failure, therefore, must not be imputed to the climate. This also is one of the principal reasons why the therapeutical results in my twenty-six cases, as detailed in the last chapter, do not appear particularly encouraging. Many of them were led into that sort of life contrary to medical advice. Nevertheless it is the duty of the medical adviser at home to impress on the patient he sends abroad for his health the necessity of observing most strictly the rules as to general *régime* and diet, in order to assist and not to counteract the beneficial effects of the climate. It is clear that this necessity is particularly great on a voyage where the changes of climate are so great and rapid, and where an invalid even of the best regulated habits has difficulty in passing the ordeal of the tropics well. It is well known how quickly the health even of the strongest constitution is ruined in hot climates without some such regulation.

Before going away an invalid should be specially admonished 1. *not to eat and drink too much.* I remember in particular two examples of voracity which were positively disgusting to their fellow-passengers. Their belief that the more they took in, the more their emaciated bodies would assimilate and gain in weight proved signally false. The warning applies above all to a hot climate.

I may be allowed to insert here a special hint for the good of invalids whose strength is much reduced. Getting up and dressing in the morning at sea may often prove a difficult task even to healthy people, when the motion of the vessel is very great, and one is thrown from one end of the cabin to the other whenever one leaves go his hold of a fixture. I have seen invalids, even when the sea was not rough, get perfectly distressed and exhausted by the task, sinking down on a seat with their cheeks flushed and perspiration pouring from their forehead, trembling and gasping for breath. Yet the invalid *must* get up, dress, and go on deck as soon as possible. In order to give him some strength for that purpose I have found a cup of warm milk, with, or without some rum or brandy, taken just before getting up, of great use.

Although *smoking* comes neither under the head of eating nor that of drinking, yet I may here say something about the question, whether consumptive invalids should be permitted to smoke at sea or not. If anywhere, here that permission might be given to such of them as are accustomed to that habit. To indulge in it is to the smoker the greatest comfort to be had at sea. Some may smile at this proposition; but they will find it true to the letter if they will only practically try it with a sea-voyage of some three months' duration. It certainly, then, would be cruel to deprive an invalid smoker of that greatest of comforts without a most weighty reason for it. Thus we are brought down to the question: *Is smoking injurious to an invalid?* I say no; provided the mucous membrane of his soft palate, and his heart are not so excessively irritable that troublesome cough and palpitations would be induced.

The tobacco smoke when sucked in by the act of smoking does not, as a rule, pass beyond the cavity of the mouth, being prevented therefrom by the closure of the faucial arch. In fact if one directs his attention to it he may feel this movement. Some people can close the fauces at pleasure, and with their mouth open. One can then see not only how the two halves of the arch approach so as to shut the uvula tightly in between them, but also how the soft palate descends *in toto*, and the roof of the tongue rises. This will easily be understood by remembering that the glosso-palatine muscle is a complete and genuine sphincter.

This explains how one may take a deep breath through the nose whilst the mouth is full of smoke without any of it getting down into the respiratory passages along with the inspired air, or how one may keep his cigar or pipe in the mouth during a quarter of an hour's talk without his throat being once irritated by smoke, though, for other reasons, I do not approve of this custom. In the latter case the inspirations will be all through the nose, the palatine arch being only opened so as to let the expirations pass that carry the vocal sounds, but being afterwards promptly shut again. Were the arch not shut, and any smoke allowed to pass beyond, into the pharyngeal cavity, it must be expired equally through the nose and the mouth. Some people are indeed able or are even in the habit of doing so. Then both the glosso-palatine and palato-pharyngeal arches are voluntarily opened, and the smoke blown out either through the nose alone, or through nose and mouth. Nor will any smoke pass beyond the cavity of the mouth at the next full inspiration following each puff, or enter the laryngeal and bronchial canal, thereby irritating their mucous membrane, if the smoke has been blown out promptly and completely. Thus it will be, if it is expelled, not by one or two short puffs, but by a regular expiration immediately following up the puff, however short; I therefore would advise invalid smokers to combine expiration with the puffing out of the smoke.

Whilst the respiratory organs are thus effectually protected from its irritating local effect, the mucous membrane of the mouth, including that of the soft palate, is fully exposed to it. Three different consequences of this local irritation occur to me. First, with many habitual smokers the mucous membrane of the cavity of the mouth, particularly that of the tongue, is found in a state of chronic catarrh. In such cases, and they are very frequent, it would, by the way, be wrong to draw any conclusion from the appearance of the tongue regarding the condition of the stomach. I do not consider this catarrh of much consequence. The sense of taste is likely to become somewhat blunted by it, and also the appetite. This latter effect is, however, much rather a direct than a secondary consequence of tobacco smoking.

Secondly, profuse salivation is induced in many persons especially by smoking pipes. By some this is considered a rather serious loss, apart from the nasty spitting it makes necessary. For my own part I do not think that the loss of a pound or so of saliva will do much harm.

The third and most interesting point relates to the effect which the irritation of the soft palate by the tobacco smoke has on expectoration. Besides the fifth and glosso-pharyngeal nerves the mucous membrane of the soft palate is supplied by the pharyngeal branches of the vagus. These, together with the superior laryngeal, are the nerves the irritation of which induces reflexly the acts of coughing, swallowing, and vomiting, which are, therefore, in close sympathetic correlation. This being so, one might even think of partly supplanting the internal use of expectorants and emetics by devising some method of irritating those nerves which are easily accessible. I have not yet, however, tried this plan practically.

After what has been said, one will understand how smoking, instead of, according to a common prejudice, being injurious to the respiratory organs may, on the contrary, prove in many cases a capital expectorant. I have been told by asthmatic[1] people that whilst on getting up they felt a great deal of oppression on their chest, they were much better after their morning smoke, which induced expectoration of the secretion that had accumulated during the night. I have also seen patients even in the third stage of consumption smoke away at their pipes almost all day long without any harm coming from it, but, on the contrary, with marked relief of their local complaint.

From these physiological relations of the vagus another beneficial effect of smoking can be understood, viz., that it helps digestion. A person accustomed to smoke a cigar or a pipe after meals will find that his stomach is not in regular working order until, by the usual smoke its peristaltic motions are made more lively. I have also seen a great many instances of smoking acting as a regulator to the bowels, which is particularly valuable at sea, where, as we have seen in the fourth chapter, a disposition to constipation is very common.

When I say, therefore, that a consumptive invalid may smoke without any harm arising from it, I am only speaking of the local effects of the habit, particularly those on the respiratory organs, but not of its effects on the nerve centres, the latter being materially the same in a consumptive and in a healthy individual. As I do not here take into consideration the pharmaco-dynamic effects of smoking in general, the merits, or otherwise, of smoking in that respect must be left to themselves. I only mention as a curiosity that by certain enthusiastic advocates of that habit some of the finest products of genius the world has ever seen are ascribed to its being inspired by—tobacco-smoke.

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[1] I do not here take asthma in the restricted sense of dyspnœa caused by nervous spasm, but in the common sense of shortness of breath from different causes.

It cannot, however, be denied that under certain conditions smoking, or rather tobacco-smoke has an injurious effect upon the respiratory organs, and through them on the blood, viz., when the smoke cannot escape by getting diffused in the open air and carried away by the wind the moment it is blown out, but accumulates in shut-up localities, smoking-rooms, &c., and thus is inhaled again and again. Under such circumstances tobacco-smoke is, moreover, found rapidly to undergo alterations in its chemical composition, the products of which are not only so unpleasant to the smell as to cause nausea, or even fainting in some nervous individuals of the weaker sex, but no doubt are also more injurious to the respiratory organs and the blood than fresh tobacco-smoke.

Now, on board a ship, if there be no smoking-room set apart there is no opportunity of polluting the air inside the ship in the way indicated, whilst on deck the smoke is promptly left behind. An invalid, therefore, cannot be hurt by it in either way.

I have devoted so much space to the discussion of this question, and as a preliminary, to the physiology of smoking, because it is not only one of practical interest, but also one on which opinions are most vague and contradictory.

2. An invalid at sea should take as *much bodily exercise* as his strength will permit. Two hours a day of systematic walking round the poop deck is for an invalid quite a respectable performance, considering that the exertion connected therewith, in consequence of the instability of the ground and equilibrium, is considerably greater on board than on *terra firma*. In a rough sea, when the ship is pitching, one has, besides, a continual change of going up and down hill. In hot weather, however, active exercise has to be restricted, or entirely given up during the day. Systematic walking should then be practised in the early morning and at night.

Beside walking exercise special *lung-gymnastics*, such as will be described in my *Principles of the Climatic Treatment of*

*Consumption,* must not be neglected on board. Here they are still more valuable than on land, where opportunities for bodily exercise are much more varied. Regular and systematic use of dumb-bells or clubs should have a place in the daily programme of invalid life at sea.

Another, and that a most energetic kind of bodily exercise and lung-gymnastics at the same time, is sponging or "douching" the body from head to foot night and morning with cold water, followed by brisk friction of the skin. At the same time the action of the skin is stimulated by this process, and thus acclimatisation, particularly to the tropical climate, is facilitated.

3. Nor should the mind of an invalid who is not wholly debilitated, and therefore requires perfect rest for a time, be allowed to remain idle during a long sea-voyage. Mr. Darwin says in respect to this, without, however, having any special reference to invalids: "If a person asked my advice, before undertaking a long voyage, my answer would depend upon his possessing a decided taste for some branch of knowledge, which could by this means be advanced."

Besides keeping a carefully written diary, in which, in particular, any new natural phenomena are described, besides practising, if possible, music and sketching, beside novel-reading, games, and talk, some more serious occupation is to be recommended to the invalid. The nearest object and most inviting to an open mind, at sea, is natural history; in other words collecting, carefully studying, classifying, and preserving all the sorts of animals and animalcules one has so good an opportunity of catching on a voyage, at least in a sailing vessel. Others may prefer historical, geographical, or ethnological studies, or if they belong to one of the so-called liberal professions, scientific studies in their respective lines. By this means an invalid may keep away *ennui* for the whole of a long voyage.

In the tropics, however, all heavy mental work is impossible to those who are not yet acclimatised. There people find even novel-reading beyond their capacities. The book soon falls out of the hand; the arms drop; sleep, or at least a state of dulness and stupor, gradually creeps over their brain.

4. With regard to the close social life on board, good-humoured

patience, freedom from selfishness, and the habit of making the best of every occurrence, are the principal virtues required. I need not remark that by taking a companion or an attendant with him on board, an invalid is not only better cared for, but also more independent of the rest of the passengers.

After having traced an outline for the guidance of his patient whilst abroad, the medical adviser has to trust to the common-sense and discretion of the former to fill up the details. Then one may hope "to derive the maximum of benefit with the minimum of those disadvantages which are inseparable from all kinds of travelling."

# Reviews.

*The Germ Theory Applied to the Explanation of the Phenomena of Disease. The Specific Fevers.* By T. MACLAGAN, M.D. 8vo. Pp. 258. London: Macmillan & Co.

*On Spontaneous Generation and the Doctrine of Contagium Vivum.* By WILLIAM ROBERTS, M.D., F.R.S. 8vo. Pp. 42. London: Smith, Elder, & Co.; Manchester: J. E. Cornish.

THE two questions of spontaneous generation and of the origin of certain forms of disease from organisms of a low type introduced into the animal body, have now been under discussion for several years, yet neither can be regarded as definitely settled. In the present pamphlet, which contains the address on Medicine delivered by him at the meeting of the British Medical Association in Manchester, along with notes and additions, Dr. Roberts deals with both questions, while Dr. Maclagan carefully separates them, and treats only of the latter. The first part of Dr. Roberts's address contains an account of original experiments on spontaneous generation. To the organisms which are the essential agents in all fermentations, decompositions, and putrefactions he gives the name of saprophytes, including under this term the yeast plant and its allies, and all the numerous species and varieties of bacteria. Bacteria have been regarded by the advocates of spontaneous generation as organisms which can arise *de novo*, but Dr. Roberts, so far from holding this view, says, that speaking as an evolutionist, he "should rather infer that saprophytes were a late development—probably a degradation from some algal forms which had found their profit in feeding on waste organic matter, and which gradually lost their chlorophyll through want of use, and with it their power of feeding on an exclusively mineral diet." "If abiogenesis is going on amongst us at the present day, it may be assumed as probable that it still proceeds on the original line laid down at the dawn of life. If ever I should be privileged to witness an abiogenic birth, I should certainly not expect to see a saprophyte, I should rather expect to see a speck of protoplasm slowly formed without shape or dimensions, and nourishing itself like the chlorophyll body on a purely inorganic diet." In the second part Dr. Roberts shows that septicæmia, relapsing fever, and splenic fever are connected with the presence of saprophytes in such a way that it is very difficult to believe that these diseases are not due to bacteria, spirilla, and bacilli respectively. In the case of septicæmia, at any rate, the fever is not caused by the mere presence of bacteria in the blood, but by the products of their action on dead or dying tissue, for bacteria may be injected into the circulation without causing fever, if they have been previously washed from septic contamination, and symptoms of septicæmia may be produced by the injection of products of decomposition, although they contain no bacteria. The organisms found in the blood in relapsing fever and splenic fever are morphologically indistinguishable from harmless forms of spirillum and bacillus, and Dr. Roberts is inclined to regard the contagium vivum in these diseases as varieties of the harmless species, just as the poisonous bitter almond is a variety of the innocuous sweet. He thinks that the origination of one disease from another, *e.g.* of diphtheria from scarlet fever, may be due to a variation in the contagium vivum, occurring accidentally and afterwards becoming permanent, in the same way as a peach-tree may produce a bud and branch which will ever afterwards bear only nectarines, and conversely a nectarine will produce a branch which will only bear peaches. He thinks also that diseases such as cholera and typhoid fever may arise *de novo* by some saprophyte acquiring through variation a parasitic habit, and thus becoming a contagious virus.

Dr. Maclagan puts aside altogether the question of the source and mode of origin of germs, and confines himself entirely to the discussion of their competence to produce the phenomena of disease. He gives a very clear summary of the evidence in favour of the view which regards contagium as consisting of minute organisms, and then assuming that such is its real nature, he proceeds to investigate the competence of such organisms to cause the phenomena of disease, limiting himself in this work to the specific fevers. He discusses separately the period of incubation, the febrile state, and the various phenomena of alterations in tissue change, elimination of urea, consumption of water, frequency of the circulation, temperature and nervous system, the mode of death, changes noted after death, treatment, action of contagia as parasites, comparative rarity of eruptive fevers, local lesions, different severity in different persons, the cessation and fixed duration of febrile symptoms, crises, exhaustion of sensibility, degrees of contagiousness, and the subject of relapsing fever. To give an analysis of the author's mode of treating the subjects just enumerated would take too long, and we must refer our readers to the work itself. In the preface the author requests his readers and critics to remember that he deals with forms of fever which are regarded as due to a specific *materies morbi,* and with them alone, leaving the consideration of other forms for a future occasion. Notwithstanding this request we cannot but observe that the author explains by the presence of organisms in the blood a number of symptoms, such as rise of temperature, increased rapidity of circulation, &c., which must needs be referred to some other cause, because they occur equally in other febrile conditions, where no proof whatever can be given of the existence of organisms in the blood or tissues. But even while we believe his explanations to be wrong, we cannot but admire the author's ingenuity. The book is suggestive, clear, and pleasantly written, and while the views it contains provoke much adverse criticism, even those who are most opposed to them may be satisfied with the way in which they are presented.

# Clinic of the Month.

**Boracic Acid Ointment.**—Mr. A. W. Bateman calls attention to the value of Prof. Lister's boracic acid ointment as a dressing for wounds in general. During the last two years he has been in the habit of using it, and has concluded that it is preferable to either dry lint or other dry applications, and also to water-dressing. For wounds, when hæmorrhage has been stopped or can be caused to cease by the application of light pressure, it is very useful, for owing to the smooth waxy consistence of the ointment, the dressing does not at all adhere to the edges of the wound, nor to the clot between its margins. The dressing can therefore be removed and replaced as often as is advisable for the examination of the wound, without disturbing the healing process. Any discharge that forms can also easily escape between the layers of ointment and the skin around the wound. The ointment is thus preferable to dry lint, except in those cases where there is a great amount of oozing when the dry lint and blood may act beneficially by forming an artificial scab. Water-dressing may be regarded as an inefficient mode of poulticing; and wounds that do not require poulticing can be better treated with the ointment than water-dressing, for prolonged water-dressing generally irritates the skin round the wound, which becomes sodden and sore, while the skins remains comparatively healthy under the ointment. The smooth surface of the ointment is less liable to destroy by friction or otherwise damage the surface of the granulations than is the lint. The ointment never sticks to the surface of the wound, and no pain or injury is caused on removal of the dressing. Another great advantage is that, owing to the antiseptic quality of the boracic acid, the dressing need only be removed every second or third day, unless the discharge be profuse. Thus time is saved with hospital patients. Mr. Bateman notices that small lacerated wounds—for example, of the fingers—will keep perfectly sweet for twenty-four hours under the ointment even in tropical climates, and here they keep quite sweet for two days, whereas water-dressing generally requires to be reapplied every twenty-four hours. In applying the ointment the dressing should extend far beyond the edges of the wound on to the surface of the surrounding skin, so as to interpose a considerable antiseptic interval between the margin of the wound and the limits of the dressing. This is the more important in proportion to the amount of discharge. (*British Med. Journal,* Sept. 22, 1877.)

**Bromide of Potassium in Bright's Disease.**—M. Chauvet has studied the effects of bromide of potassium in Bright's disease. M. Bouchard had fixed the time for the elimination of the drug at nineteen days after its administration; M. Chauvet, however, found bromine in the urine, on one occasion on the thirtieth, on another on the thirty-fifth day. The iodides eliminate much more quickly; in the healthy subject (M. Chauvet himself, for instance,) the drug was completely eliminated at the end of one or two days. In patients suffering from Bright's disease, this elimination lasted once four days, once five days, once seven days, once twelve days. The same thing occurs in the case of salicylic acid, which is also eliminated very quickly in the healthy condition, and much more slowly in cases of renal disease. In these different cases of kidney-disease, the toxic phenomena soon appear, and do not disappear for a long time. All M. Chauvet's experiments go to corroborate M. Bouchard's proposition: that kidney diseases cause active medicines to manifest toxic properties even when administered in small doses; and it is thus that M. Bouchard explains how in certain cases of heart disease the accumulation of digitalis produces toxic effects, which should be attributed to the condition of the kidneys, which are often secondarily affected. (*Ibid.,* Oct, 6, 1877).

**Buisson's Treatment of Hydrophobia.**—An Edinburgh physician sends the following extract, which he states he copied from an old journal some years ago:—M. Buisson of Paris was inoculated by hydrophobia virus whilst attending a patient who was affected. He felt all the symptoms of the disease, constriction of the pharyngeal muscles, &c. He entered a Russian vapour bath, 107° Fahr., resolving to terminate his life by suicide. To his astonishment the symptoms gradually subsided, and he in time completely recovered. Since then he has treated eighty cases successfully. His mode of treatment is this: the person bitten should take a certain number of vapour baths, and every night should induce a violent perspiration by wrapping in flannels and lying under a feather bed, and by drinking freely of warm decoction of sarsaparilla. So convinced is he of this mode of treatment proving successful, that he will suffer himself to be inoculated with the virus. Dancing is also recommended to produce sweating. Animals which do not perspire—as dogs, wolves, and foxes—are most frequently affected with hydrophobia. Dancing was an old remedy for the cure of tarantula stings. (*The Lancet*, September 29, 1877.)

**Treatment of Fissures of the Breast by Picric Acid.**—M. Charrier utilises the hardening properties of picric acid in the treatment of mammary fissure. He paints the fissure once a day with a solution of thirty parts of picric acid to 1,000 of water, and also immerses the nipple in a little glass filled with a solution of picric of one part per 1,000 after each time of suckling. (*British Med. Journal*, Oct. 6, 1877).

**Choleate of Soda as a Medicine.**—Dr. W. C. Van Biber reports five cases to show that choleate of soda may act as a substitute for the bile when the secretion does not enter the duodenum. This he considers to be most desirable in cases of chronic jaundice. In these cases, the use of the remedy improved the digestion, and the author's theory is that it acted as a substitute for the bile. In none of the cases did an attack of colic occur during its administration. He recommends choleate of soda in certain cases of dyspepsia, dependent on functional derangement of the liver, and in chronic jaundice, when it is evident that a sufficient amount of bile is not poured into the duodenum. In the former, he considers that it will be quite as serviceable as pepsine is in other forms of indigestion, on the principle of supplying a substitute for a physiological secretion. He refers also to the use of the choleate as proposed by Dr. Dabney, as a preventive of the formation of gall-stones. (*Ibid.*)

**Cure of Tetanus by Chloral.**—M. Gueniot reported to the Society of Surgery in August an interesting case of tetanus developing itself twenty-two days after an amputation of the breast. It was treated successfully by a remedy which already counts a considerable number of cures in this disease. Chloral was administered very energetically (twenty-five grammes in forty-eight hours). From the first day, the improvement was such that cure might be hoped for; it was not, however, finally attained till the end of several weeks. About 100 grammes (upwards of two ounces) of chloral were administered, sometimes by the mouth, sometimes by injection, according to the state of tolerance. (*Ibid.*)

**Hyperventilation in Certain Diseases.**—Dr. Handfield Jones considers this plan of treatment to be advisable for cases of tuberculosis, pyæmia, septicæmia, puerperal fever, and perhaps typhus. To carry it out the hospital or patient's residence should be in a healthy situation, say a breezy heath, or an upland, such as that on which the Caterham Lunatic Asylum is placed. If such a site be unattainable, the next best thing is to have a lofty building, standing high above all sources of air contamination, such as manure heaps and gully holes. The ward where all his patients are placed stands about sixty feet above the ground, and as the windows are always opened from the top the entering air comes from a level outside about ten feet higher. If the patients are well supplied with good bed coverings, have warm shawls fastened round their shoulders, and hoods with flaps over their necks, they run no risk of being chilled by currents of cold air. The upper sash of the windows should be opened three or four feet, and the door should be open, especially in the summer. In winter, with a good fire, the door may be closed. Such ventilation is intended to place the patient in as nearly as possible the same condition as if he were in the open air, except that he is sheltered from wet and cold, or excessive solar heat. Its object is to increase the aëration of the blood, induce or promote destructive oxidation of morbid matters, and to favour also their elimination from the lungs in the expired air. It is not applicable to those who are suffering from rheumatic fever, Bright's disease, laryngitis, acute or chronic bronchitis. Dr. Jones states that he has obtained excellent results by this method of treatment. (*Lancet*, No. 13, vol. ii.)

**Treatment of Hæmorrhage from the Retroflected Uterus.**—Dr. Braxton Hicks refers to the opposite opinions that have been advanced in regard to the treatment of the retroflected uterus, one strongly in favour of mechanical treatment, the other, if not actually repudiating it, yet considering it the *dernier ressort*—not to be tried till constitutional management and local treatment have failed. The difference of the extreme opinions is owing, he thinks, (1) to the fact that women are not unfrequently found with completely retroflected uterus, without the least complaint or uneasiness all their lives. (2) That women complaining of certain symptoms, and even crippled by them, are found to have retroflected uterus, all of these symptoms subsiding upon the restoration of the uterus to its normal position. (3) It is often observed that before the retroflexion is confirmed the uterus is sometimes retroflected, and at another time in normal position. (4) That temporary engorgement of a retroflected uterus, which had before given no trouble, frequently subsides under horizontal posture and appropriate treatment. According as these conditions have presented themselves, in respect of number and intensity, to the various observers, so have their opinions inclined in one direction or the other. Now in a typical example the uterus is completely retroflected, the body two or three times the normal size, sensitive to the touch, especially at the fundus; the os and cervix are large and patent; there are much leucorrhœa and menorrhagia, with greater or less bleedings between; coagula passing often, sometimes with pain; pain in the back; bearing down; uneasiness in the groin. This state, Dr. Hicks observes, has been regarded as inflammatory, so that any manual attempt to restore the uterus to its normal position, and to retain it there by pessaries, is injudicious. He points out, however, the various advantages that may be obtained from the use of pessaries, and declares that in no instance where he has restored the uterus to its normal position has he found any inflammatory symptoms follow, and that in no case has he met with any other result than improvement; the uterus gradually becoming smaller, less sensitive, and the discharges from it less, till it gradually resumed its normal state, so far as was compatible with a certain amount of permanent thickening, the result of the former engorgement. Where hæmorrhage is a symptom it rapidly diminishes in amount after the uterus has been restored to its natural position. Dr. Hicks, therefore, is a strong advocate for the direct treatment of the displaced organ, the retroflexion being first reduced by the hand, and the new position being then maintained by a pessary (Hodge's), aided, if need be, by a rest and the horizontal posture. (*Brit. Med. Journ.*, Oct. 6, 1877.)

**Note on Lactopeptine.**—Dr. Ivor Murray states he has been using this remedy somewhat extensively during the last year. One of his cases was that of a lady suffering from uterine affection with very obstinate dyspepsia, which had baffled all ordinary treatment. Lactopeptine in fifteen grain doses given three times a day in a little water after meals did more, he thinks, to restore her digestive power than anything he had previously prescribed. She has persevered in its use from time to time as the stomach appeared to require assistance. With the improvement in her general health the uterine symptoms have also ameliorated. Dr. Murray has also used lactopeptine in a large number of cases of weakened digestion, and in the majority of cases with marked success. Even in very young children he has seen great benefit result from its employment, especially in those cases which are attended with obstinate vomiting. The composition of the preparation, which has been published, would, he thinks, lead to a favourable *à priori* opinion of its efficacy in the cases for which it is recommended, and he has no hesitation in stating that as far as he has used it the combination is very materially more successful in its results than its component parts in any combination in which he has hitherto employed them, whilst it is both more readily taken and retained than pepsine in those cases in which it is advisable to prescribe that remedy. (*Ibid.* Oct. 13, 1877.)

**The Arsenical Atmosphere of Solfatara in the Treatment of Consumption.**—D. Horatio R. Storer of Sorrento calls attention to the fact that whilst the climate of Southern Italy is not in general well adapted to invalids, on account of its changeable character, the Neapolitan physicians are commencing to claim for Pozzuoli an exceptional excellence, which they attribute to the peculiarity of its atmosphere. This is stated to be charged not with sulphur merely, but with arsenic from the semi-extinct volcanic crater known as the Solfatara, a place that is easily accessible on foot or by donkey and sedan-chair to the most confirmed invalid. The breathing of this arsenical atmosphere not only theoretically promises to be of benefit in cases of threatened or actual pulmonary tuberculosis after repeated visits to the crater, extending over a longer or shorter period, but has in fact been proved to be so by actual experiment. Various cases are given of the success that attended a residence in this district, and Dr. Storer thinks it not unlikely that in the future the crater of Solfatara may become as famous for its effect upon the prolongation of life as the neighbouring Grotto del Cane has been for imperilling it. (*The Lancet*, September 29, 1877.)

**The Prophylaxis of Phthisis.**—At a meeting of the Paris Academy of Medicine, M. Lagneau read a paper which was referred to the Committee on Hygiene, in which he advocated strongly the enforcement of measures of public hygiene with a view to diminish the frequency of phthisis. This terrible scourge of the inhabitants of the temperate zone is, he showed, more prevalent in Paris, than in Berlin and London, reaching a mortality of 18 per cent. : a proportion in which it is exceeded by Brussels and Vienna. He pointed out that whereas formerly the male deaths from phthisis were less than the female, the proportions between the sexes has now become reversed, the male mortality being to the female as 115 to 100. Further that the mortality was higher by one-fourth among the immigrant population (country folk and foreigners) than among the native Parisians. After alluding to the fact that the disease prevails in warm and cold climates, M. Lagneau pointed out that certain regions enjoyed an immunity, such as certain altitudes in the Alps, Pyrenees, Cordilleras, Andes, the Mexican plateau, and certain northern countries, as Iceland, the Hebrides, portions of the north-west of Scotland, and the Faroe Islands. Although the only point in common between these mountain districts and northern countries is the possession of a low temperature, he showed, however, that cold could not be considered as preventive of phthisis, for M. Homann has shown it to prevail at Christiansund, in 62° north latitude, with a mean annual temperature of 45° C. (40° F.), and M.M. Etzel Billebon, and Guerault report a certain proportion of deaths from pulmonary consumption in Greenland. In France itself a far larger number claim exemption from military service on account of chest disease in the northern departments, as those of the Nord and Pas du Calais, than in the rest of France ; but there is likewise a fair proportion even in the Mediterranean departments,—where sufferers are so often sent. M. Lagneau showed also that poverty and insufficient nourishment do not go hand in hand with phthisis, the inhabitants of those districts where the disease prevails being in much better circumstances than many others where phthisis is almost unknown. Pursuing his analysis further he finds a general concensus of opinion among French authorities as to the favouring effect of sedentary occupations and trades ; the department of Morbihan, which furnishes the fewest instances of the disease being also the least industrial part of the country. He urged therefore the formation of free gymnasia, the encouragement of athletic exercises, formation of choral societies, establishment of public sanatoria for the phthisical, prevention of over-crowding in workshops, and means taken to procure a good supply of air and light in newly built dwellings, legal restrictions against juvenile labour, the encouragement of physical exercises in the Lycées and schools, and the substitution of rural camps in place of barracks, where the young soldier could pass his term of military service.—(*Ibid.* Oct. 6th, 1877.)

# Extracts from British and Foreign Journals.

**Ergot as a Styptic.**—Dr. Norman Dixon gives a case of urethrorrhagia consequent on unduly prolonged intercourse in which ergot acted well as a styptic. Hæmorrhage had continued for nineteen hours, and was still profuse when the patient was seen, though he was then very pale and faint. Dr. Dixon at first thought of employing sulphate of iron solution, but feared it would form coagula in the urethra, occluding the passage for the urine. Upon consideration he remembered that ergot would not produce the same effect. He therefore injected one drachm of Squibb's fluid extract of ergot every thirty minutes. Five injections completely arrested the hæmorrhage without the formation of any coagula in the urethra, and rapid recovery resulted. (*Cincinnati Medical News*, Vol. ix., No. 107.)

**Treatment of Ischuria Dependent on Hypertrophy of the Prostate.**—E. Bottini proposes to treat the difficulty commonly experienced in passing water in cases of hypertrophy of the prostate gland by the galvano-caustic method. He recommends, according to the kind of the hypertrophy, either the galvano-caustic erosion or simple section of the enlarged lobule. The galvano-caustic destined for erosion, resembles the well-known prostate catheter of Mercier. It consists of two brass limbs attached to a rod, which are completely isolated from each other by a piece of ivory. Near the centre of the concavity of the instrument is situated the eroding apparatus, which consists of a **U**-shaped piece of platinum about 1½ inch in length, of which one branch is soldered to the posterior, the other to the anterior limb of the instrument. The connection with the battery is effected by means of a Middeldorpf's handle. As soon as the beak of the instrument is found to be freely movable in the bladder, which should be tolerably full, it is brought by a *tour de maître* through an angle of 180°, to such a position that the concavity looks directly backward, and is in contact with the hypertrophied parts of the prostate. These, embraced as by a hook, can now be destroyed with the greatest precision, without, as autopsy has revealed, in any way damaging the surrounding parts. The thermo-galvanic incisor resembles a lithotrite, the male arm of which is composed of a platinum blade, which is attached to the staff by means of copper points, and glides in the glass appendix of the female arm. The points of the instrument must, when in use, be firmly pressed against the lobe requiring division. Neither the process of erosion nor of division occasion much pain, so that anæsthetics are not required. The urine soon begins to flow after the operation, however severe may have been the previous strangury. No bad results have hitherto followed the use of the instruments, and not even vesical catarrh has been observed, though the urine continues to be bloody for a little while. Galvano-caustic erosion is best adapted for partial and only slightly projecting swelling of the supra-collicular part of the gland. On the other hand galvano-caustic fusion is more appropriate for cases where the whole gland is enlarged, or where particular lobes have undergone great hypertrophy. In such cases it is advisable to make the instrument press against the depression between two adjoining elevations, rather than against the projecting mass. The contra-indications against this mode of operating are inactivity of the detrusors, highly abnormal condition of the urine, and coincident extensive disease of the kidneys. (V. *Langenbeck's Archiv*, Band xxi., p. 1.)

**Treatment of Chronic Pulmonary Affections.**—Dr. H. F. Williams records the case of a man in the second stage of phthisis with a bad family history. He was weak, anæmic, constipated, hectic, with anorexia, and for several nights had had cold sweats, pulse 110, temp. 102·5. There was increased vocal fremitus of the right side, and marked dulness in the infra-clavicular regions. A deep-seated moist *râle* was audible in the scapular region. There was the most offensive odour from his breath. The treatment pursued by Dr. Williams was the immediate relief of the constipated condition of his bowels by the solutio citratis magnesiæ. He then ordered a preparation containing quinine with spirit ætheris nitrosi as a solvent, and glycerine. A fresh emulsion of cod-liver oil, with the hypophosphites of lime and soda, was given regularly, and lastly, for the immediate relief of the cough, he advised the spray of pure carbolic acid, ten drops of which were inhaled in an atomized state every four hours. He was further advised to take a lukewarm sponge-bath every morning, to be immediately followed by a thorough inunction of olive oil. Great improvement followed. The points to which he wishes to draw attention in the treatment adopted are: (1) The avoidance of systemic sedatives, and the substitution of local anæsthetics for the relief of cough. (2) The use of quinine. (3) The use of alcoholic stimulation, and (4) the efficacy of topical medication in chronic pulmonary affections. In regard to the first he observes that it is a very undesirable practice to administer any systemic sedative when it is of prime importance that the system should be kept in a state of normal action. Morphia might have quieted the cough and given sleep, but the secretions would have been dried up, the stomach nauseated, and the bowels constipated; all conditions that would have necessitated further treatment. In regard to the use of quinine he thinks it is one of the best antipyretics we possess, and in lowering the temperature it staves off, in such cases as the above, the fatal issue. Alcohol would have had a tendency to increase the temperature, and would have dulled the sensation of hunger; it would have produced artificial animation, and have been followed by depression, and hence he did not prescribe it. In regard to the efficacy of topical medication, he quotes Dr. Moritz, who, speaking of the results of his trials of carbolic acid in various forms of bronchial catarrh, says that this affection either ceases to appear or is soon cut short. He sprays the whole atmosphere of a small room with the acid, choosing the night as the most convenient time. It seems, Dr. Williams thinks, to exert a healing influence on any diseased mucous surface, and possesses the same properties of other acids for stimulating and depurating chronic ulceration. For the relief of simple bronchial catarrh, he has inhaled the ex. pinus Canadensis; in the morning the sputa that have been expelled from the bronchial tubes have been abundantly tinged with the red colour of the inhalent used on the previous evening. He has seen coagula as they were coughed up, contracted on their surfaces by the astringent, whilst their centres were still in a fluid condition. Any passive hæmorrhage can be controlled almost instantly by astringent inhalations. All this he thinks shows that the remotest parts of the lung can be reached by the atomizer, and if a bleeding point can be controlled by an astringent, why cannot a gangrenous tract be disinfected, or an indolent tract stimulated? (*Proceedings of the Medical Society of the County of King's, Brooklyn, N.Y.*, June, 1877.)

**Treatment of Aphthæ.**—A good account of the various plans that have been adopted for aphthæ is given by Dr. John C. Peter's, the President of the Medical Society of New York. He describes aphthæ, and points out the diagnosis from diphtheritic stomatitis, thrush, and true follicular ulcerations. He then proceeds to enumerate the following remedies:—*Cascarilla*, which was recommended even in the gangrenous thrush of children, by Underwood, as an aromatic bitter and tonic, for the relief of the atonic dyspepsia and debility from which aphthæ often arise and for the diarrhœa which frequently attends it. *Calx.* Dewees found great advantage from lime-water and milk, in doses of one-quarter or one-half a teaspoonful four or five times a day in infantile aphthæ when there were green but not liquid stools. When the diarrhœa is profuse prepared chalk is preferable, or the chalk mixture may be used. *Calx chlorinata*, made up in the form of a gargle in the proportion of two to four drachms to one pint of water with one ounce of honey, has been recommended, as correcting fœtor, and stimulating the parts to healthy action. The solution should be filtered before the honey is added. *Nitrate of silver* applied in substance to the ulcers is spoken of by Dr. Symonds and Niemeyer as an efficient and decisive remedy, but is now seldom used unless the chlorate of potash fails, and the same may be said of muriatic acid. *Carbolic acid*, in the proportion of one part to forty of water or glycerine, is used as a stimulant and antiseptic mouth wash and gargle in stomatitis, aphthæ, diphtheria, and ulcerative sore throat, especially when there is fœtor of the breath. *Liquor chlorini*, or chlorine gas dissolved in half its volume of water when largely diluted is a tonic stimulant and disinfectant. One part of the gas to eight parts of water is the average strength for a gargle or lotion, and has been used successfully in aphthæ, stomatitis, and cancrum oris. *Sulphate of copper* is an excellent application, either in substance or five grains incorporated in half an ounce of honey. *Decoctum Cydoniæ* (120 grains of the seed to one pint of boiling water) is a frequently used demulcent, and is a good vehicle for other remedies. *Geranium maculatum.* The virtues of this plant depend upon the quantity of tannic and gallic acids contained in it. *Hydrochloric acid* (ʒj to ℥j of honey) is regarded by some as a useful application. *Magnesia* is used as an antacid and absorbent in aphthæ. *Mel* or honey was employed by Hippocrates to cleanse foul ulcers, and the Arabian writers dwell on its advantage in affections of the mouth and fauces, particularly when mixed with vinegar. It is now usual to associate it with borate of soda, or chlorate of potash, both of which materially increase its efficacy. *Mercury* is used by the homœopathists, and Niemeyer recommends grs. i.—ii. of corrosive sublimate in a pint of water as a wash. *Chlorate of potash* is used, and is regarded by many as a specific in aphthous inflammation, diphtheritic inflammation, cancrum oris, and gangrenous stomatitis. From 20 to 60 grains may be given in the course of twenty-four hours. The *chlorate of soda* is more soluble than the chlorate of potash and is at least equally serviceable. *Alum*, although more astringent is not so useful. *Quinine* proves highly serviceable in aphthous ulcerations, when the patient is much debilitated, but the *muriated tincture of iron* may surpass it. *Sodæ bicarbonas* proves effectual when given with a few grains of rhubarb or chalk. *Borax* is a popular, and at the same time an efficient remedy. Ringer advises the glycerine of borax, one part to eight, in aphthæ, and in the curdy exudation of thrush. (*Virginia Med. Monthly*, May, 1877.

**Poisoning by Carbolic Acid Treated by Apomorphia.**—G. W. Semple states that a patient took by mistake two teaspoonfuls of strong carbolic acid. In a few minutes she was in a state of great debility and complained of a violent burning sensation from the fauces to the stomach. The pulse was full, slow, regular and strong. Solution of bicarbonate of soda was ordered and taken. She quickly, however, fell into a semi-comatose state, and was with difficulty made to swallow six ounces of olive oil. Forty minutes after taking the poison rather more than ½ a grain of apomorphia in twelve minims of water was injected subcutaneously. In three minutes there was copious emesis, which continued at intervals of twenty minutes for an hour and a half. A very large fæcal evacuation followed, with an abundant flow of smoky-coloured urine, having a strong odour of carbolic acid. Recovery, without ill effects, took place. Dr. Semple lays great stress on the rapidity with which the apomorphia acted as an emetic, and strongly recommends all who practice, to keep it in solution, as it requires some time to make up. (*Ibid.*)

**Lime Water and Milk as Food and Medicine in Pregnancy.**—Dr. E. N. Chapman, after pointing out that the use of milk has largely supplanted that of broths, and many farinaceous compounds for invalids and infants, as well as for those of riper years, refers to the serious objection that exists to it in consequence of the large solid curds formed in the stomach by the action of the gastric juice being quite indigestible, a condition of things which is identical with that of pieces of meat being swallowed entire. To remedy this the addition of an alkali has been advised, particularly in the case of infants. Lime, potash, soda, and ammonia have been selected indifferently, as the action of each is thought to be the same—the removal of acidity and the promotion of digestion. Now, an ounce and a half of lime water, containing less than a grain of the alkali, will, when added to a glass of milk, obviate its bad qualities and render it the best substance that can be given even to those who never drink it plain without a sense of uneasiness and weight at the epigastrium, and that, too, though employed as the sole diet in typhoid cases. Dr. Chapman notices the peculiar action of lime on oil and on milk. An ounce of lime water and an ounce of olive oil when shaken together become a thick honey-like mass that does not change by keeping, a permanent emulsion in fact. There is, he thinks, a like reaction between the lime and the oil globules of milk intensifying the emulsion already existing. He also observes that 4 grains of pepsine will precipitate the casein of an ounce of plain milk almost immediately, but if lime water be first added, not for three or four hours. The first experiment yields dense adherent masses, but the second, fleecy broken curds, that are so soft and fine, as on agitation to blend again with the whey and restore the original white opaque colour. The emulsion formed by the reaction between the cream and lime is not disturbed by citric or hydrochloric acid, nor is a black precipitate thrown down by calomel. Dr. Chapman, therefore, concludes that the addition of about one ounce of lime water to eight ounces of milk renders it a perfect food by enabling it to resist the prompt action of the gastric juice, causing the precipitate eventually formed to be soft and flocculent and easily digestible, and thus allowing all the constituents properly elaborated to be presented to the lacteals for absorption. For those who dislike the flavour of milk, he recommends that a thin gruel should be made of farina or ground barley, to which five or six parts of milk may be added. He does not find milk and lime water of much service in the sickness of pregnancy, but it has in his hands proved very useful in the debility that occurs after confinement; in cases of poverty of the lacteal secretion, in those of exhaustion after lactation, and in the dementia of the puerperal state. (*Proceedings of the Med. Soc. of the County of King's, Brooklyn, N. Y.*, June, 1877.)

**Phytolacca Decandra in the Treatment of Mastitis.**—Dr. A. A. Moore, of Camden, South Carolina, states that four or five years ago Dr. Biggers reported a few cases of threatened mammary abscess, which he had treated successfully with the fluid extract of poke-root, and that recently he has had occasion to avail himself of the same plant. Notwithstanding the process of hardening the nipples had been resorted to preparatory to nursing, about ten days after confinement the lady's nipples became excoriated and fissured. For this, compound tincture of benzoin, nitrate of silver, &c., were tried in vain. A few days later a hard lump was discovered beneath the left nipple, accompanied with throbbing and shooting pains through the gland and down the left arm, and with oozing of pus through the nipple. Heeding this premonition of further trouble, and still hesitating to resort to the anti-galactigogue properties of belladonna, he immediately began the administration of fluid extract of phytolacca decandra. He gave twenty drops every three hours in a wine-glassful of water until the lady had had nine doses, or about three fluid drachms. By this time all symptoms of inflammation and abscess had entirely disappeared, and the only remaining source of discomfort was the soreness of the nipples. By the aid of a large nipple shield, fitted over a glass base, this trouble was also overcome. It is to be noted, however, that before the patient had taken the last two doses she began to experience some of the neurotic effects of the drug, such as vertigo, dimness of vision, nausea, &c. The phytolacca did not appear to exert any deleterious action on the lacteal secretion as the infant continued to nurse regularly and without any ill effects whatever. (*Virginia Med. Monthly,* May, 1877.)

**Paquelin's Thermo-cautery.**—Prof. Corradi has applied successfully in practice the new thermo-cautery of Paquelin, the action of which is based on the property of the ether of petroleum (Lucilina), when pulverised by Richardson's spray producer, to render platinum incandescent, when previously heated in the flame of a spirit-lamp. The instrument is constructed in various forms, as with a nummular, pointed and cutting extremity. The instrument has some advantages as well as some disadvantages. It is not very portable, nor can any form of loop be used which is so readily adapted to the thermo-electric cautery. On the other hand it is inexpensive, requires but little care to keep it in order. Its action can, moreover, be maintained indefinitely. (*L'Imparziale,* No. 7, 1877.)

**Transfusion of Blood in Pernicious Anæmia.**—At the medical congress, held at Hamburg this year, Professor Quincke reported two cases of successful transfusion of human blood in pernicious anæmia. After the transfusion, partial destruction of the red blood corpuscles took place, manifesting itself in transient hæmo-globinuria, and corroborated by direct numeration of the corpuscles, the cause of which was probably the different character of the blood in the patient and the person from whom the blood was withdrawn. The blood corpuscles subsequently greatly increased in number, and the abnormally small and variously formed corpuscles disappeared. There can be no doubt that transfusion is extremely useful in some cases of pernicious anæmia. (*Med. chirurgische Rundschau,* March, 1877.)

**On the Influence of Diminished Supply of Oxygen to the Tissues on the Disintegration of Albumen in the Animal Body.**—Dr. A. Fränkel, agreeing with the cardinal proposition laid down by Bischoff and Voit, that the urea excreted under normal conditions, is chiefly derived from the disintegration of albuminous food, and that all the nitrogen of the decomposed substances is eliminated by the solid and fluid excreta, suggests that in pathological conditions it is no longer the food but the organs of the body which constitute the source of urea, and that definite conditions must be present under which the organised substance is abnormally disintegrated. The effort to discover these conditions without, at the same time throwing the animal experimented upon into a febrile state and thus complicating the experiment, led Fränkel to pay attention to another series of pathological processes, which, whilst causing great increase of the disintegration of nitrogenous compounds, was essentially different from fever, in the circumstance that this disintegration was occasioned by the ingestion of well marked chemical substances into the body. With this object in view he tested in different animals, 1. The action of acute phosphorus poisoning on the interchange of tissue. 2. The action of obstructed pulmonary interchange of gases on the decomposition of alcohol. 3. The influence of poisoning by carbonic oxide upon the interchange of nitrogen. The changes in the disintegration of the tissues resulting from abstraction of blood was not investigated by Fränkel because a carefully conducted series of experiments had already been made by Bauer. The main interest attaches to the researches made under the first head because they enabled Fränkel to follow with certainty the conditions on which the abnormal excretion of urea in the diseased organism depend. The chief peculiarities of acute phosphorus poisoning manifest themselves in the lowering of the oxidation processes on the one hand, and on the other in the increase of the disintegration of albumen. The former finds a probable explanation in the great destruction of red blood corpuscles, (the carriers of oxygen to the tissues) within the vessels, as well as in the loss of large quantities of blood which are permanently withdrawn from the respiratory process in consequence of hæmorrhages which result from changes in the walls of the smaller vessels. The increase in the disintegration of albumen is, however, a great difficulty in the way of this explanation, for this might either be due to a diminution in the processes of oxidation consequent on phosphorus poisoning, or might itself be a cause of the diminished oxidation process. The researches undertaken under the second, third, and fourth heads were made with the object of deciding the question whether the augmented disintegration of albumen was really conditioned by a diminution in the activity of the oxidation processes.

The subjects of the experiment were dogs, weighing about 50lbs., which were either fasting or fed on sufficient meat and fat to equalize the consumption and elimination of nitrogen. The urine was withdrawn by means of a catheter and the proportion of urea estimated by Liebig's method. The supply of air was carefully regulated by a Trendelenburg's plug-canula. The result of the experiments was that on those days on which the supply of air was greatly diminished, and even lowered to the minimum, the amount of urea eliminated, augmented, as compared with the preceding days, fifty and even one hundred per cent. It increased also, though in a smaller proportion, in the experiments made with carbonic oxide gas. The proportion of gas inhaled was only from one half to five per cent., and the excess of urea was about seventeen per cent. These experiments agree with those of Bauer above alluded to, who found that the disintegration of tissue after withdrawal of blood led to increased excretion of urea, and to coincident diminution in the absorption of oxygen. The true explanation of this, according to Fränkel, is that the animal body has only the power of decomposing dead or dying, but not living, albuminous tissue, and the amount of disintegration of this tissue is dependent on the quantity of such dead material as is present in the body, whether introduced from without, or formed from within. If now the supply of oxygen be greatly reduced the organs begin to die, just as certain parts of the body undergo necrosis when their supply of blood is cut off, and as these dead parts are eliminated from the body their discharge gives rise to an increase in the amount of urea. Fränkel gives an analogous explanation in the case of phosphorous poisoning and in fever. (*Vichow's Archiv*, B. lxvii Heft 3.).

**Treatment of Whooping-Cough.**—Dr. Brynberg Porter observes that some members of the profession think it useless to treat whooping-cough at all, considering that ordinary cases do well of themselves, whilst fatal cases result from complications. These complications, however, he remarks, are best avoided by cutting short the disease at as early a period as possible, since all authorities agree that severe complications almost invariably occur after the affection has lasted some time, when it has reached its height and the paroxysms are of the greatest violence. Moreover, granting that pertussis does as a rule "get well of itself," is it not, he asks, better to save the little patient weeks and months of suffering, especially since a severe attack of this disease is always debilitating, lowering the vitality and rendering the system peculiarly sensitive to all influences which injuriously affect the health. After a very extensive experience in whooping-cough he has found the most reliable and satisfactory agent he has employed to be chloral. It has the great advantage over quinine in solution (which he has also used with success) of not being unpleasant to the taste when given in syrup. Dr. Porter believes chloral to be a perfectly safe remedy, and he has never known the slightest untoward symptom to be occasioned by its use in the disease, if used with ordinary caution. He advises commencing with only small doses, but the quantity can be increased with impunity. He gives the manner in which Professor Thomas now treats his cases with ether treatment. The nurse is instructed to wear a cotton glove on the right hand, and as soon as a paroxysm commences, to saturate it with ether, and put it over the mouth and nose of the child; which he says, has the effect of cutting short the coughing spell. This procedure must be anything but agreeable to the patient, and in many cases Dr. Porter thinks would be impossible to carry out. Before using chloral he was in the habit of prescribing belladonna in pertussis; but had to give it up on account of the unsatisfactory results which he obtained. He is inclined to believe that the want of success was due to the fact of not using sufficiently large doses, for he has noticed Dr. Charles Kelly found that in the treatment of whooping-cough, half an ounce of the tincture of belladonna in twenty-four hours could be safely taken by children of three or four years of age. Dr. Porter finds that his observations tend to show that of the children suffering from the disease who are ill enough to cause their parents to seek medical advice, a considerable majority are girls, and that while only a trifle more than one-half of all the male cases treated can be classed as "severe," fully five-sixths of the female cases come under this category. (*New York Medical Journal,* March, 1877.)

**Podophyllin in Habitual Constipation and Hæmorrhoids.**—Dr. Rousselet gives the result of the employment of podophyllin in forty-seven cases. He finds the powder of podophyllum superior in its action to the resin, which, as sold, is often inoperative. In habitual constipation the use of the remedy must be continued for two or three months, and care should be taken that the action of the bowels should be solicited with regularity at the same hour every morning. He commences by prescribing about one-sixth of a grain, increasing the quantity to a small extent day by day till the desired action is obtained. The same quantity is then given daily for a fortnight, when at first one day, then two and three days are allowed to intervene between the doses. In cases of mechanical occlusion of the alimentary canal, podophyllin possesses the advantage that it may be used for a long period without harm. It is especially useful in hæmorrhoids, rendering the motions pultaceous, and quickly causing the disappearance of the swellings. (*Gazette Médicale de Paris,* Tome 6, No. 21, 26.)

**Croton Chloral in Dentistry.**—Dr. C. J. Cleborne writes that the specific effect of croton chloral hydrate upon the fifth pair in neuralgia, suggested its use as an internal and local anæsthetic in toothache. He has derived prompt relief from its use in 5—10 grain doses in the toothache of dyspepsia and pregnancy, and in those aggravating cases which occur in rheumatic and neuralgic patients. Failing to relieve by the ordinary remedies a severe attack of toothache, due to dental caries, he found that a mixture of equal parts of crystallized carbolic acid, croton chloral hydrate and solid Japanese oil of peppermint, promptly removed the pain and obtunded all sensitiveness during the process of filling. Dr. Cleborne suggested the use of this compound to my dentist, who assures me that he has found it to be the best " obtunder " he has used for deadening the pain of sensitive dentine, and for removing soreness of the gums, which sometimes results from filing and operations upon the teeth. In toothache, after the mouth has been washed out with a solution of bicarbonate of soda in warm water, and the cavity of the tooth dried with a pledget of cotton-wool, a small piece of the latter should be soaked in the above mixture—gently pressed to remove excess of moisture—introduced into the cavity, and covered with a small piece of dry cotton-wool; or the latter may be first dipped into styptic-colloid or collodion, and then lightly pressed home. In filling teeth, when it is not necessary or expedient to destroy the pulp by arsenic or other escharotic, nearly all sensitiveness may be allayed, during the preparation of the cavity, by the following plan: Arm a fine punch with a small ball of cotton-wool, dip it into the mixture (removing any superfluous material by a little pressure), introduce it into the dental cavity, and retain in position by the introduction of a second piece of wool. In the course of five or ten minutes the cotton-wool may be removed, and the excavation of the cavity may be proceeded with until it again becomes sensitive, when the application should be renewed, and repeated as often as it may be necessary until the cavity is ready for the plug; a result which may be accomplished with little or no pain, and without injury or destruction of the nerve. (*The Medical Record*, vol. xii. No. 20.)

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# Department of Public Health.

## SANITARY BYE-LAWS.

It is still very imperfectly understood, both by the profession generally and by the public generally, how large a proportion of the detailed work of sanitary authorities is done under the provisions of certain bye-laws. These bye-laws the local sanitary authorities are themselves empowered to make for specified purposes by the statute law relating to sanitary matters and subject to the approval of the Central Sanitary Authority. By this arrangement, familiar in English legislation touching corporate bodies and local interests, a certain degree of elasticity is given to the statute law, enabling it the more readily to be adapted to local peculiarities, and thus to meet local requirements. The theory of legislation in this form would appear to have been the development of local government in a mode best adapted to meet particular local needs, but, so far as sanitary matters are concerned, it must be confessed that the practical realisation has fallen far short of the theoretical conception. Two things have seemed to contribute principally to this result: first, certain legal difficulties which have affected the validity of bye-laws in courts of law; and, secondly, the very restricted limits within which the Central Authority has held admissible the variation of bye-laws to meet the different needs of different localities. For existing bye-laws, except such perhaps as have been introduced into local Acts of Parliament, have been as a rule framed with reference to forms suggested by the Central Authority, and these forms have come to be too commonly regarded both by the Central and Local Authorities as if they were as imperative and inflexible as the statute law. No doubt much of this want of flexibility in the framing of bye-laws has arisen from legal sources; but there can be little question that the conception which underlies and should give vitality to bye-laws early became weakened and eventually almost lost sight of. Instead of proving helpful to the development of healthy local sanitary self-government, the bye-laws have too frequently had the opposite effect, cramping local effort by a narrow legal interpretation, and by the *doctrinaire* mould in which the forms of bye-laws suggested by the Central Authority were cast.

The importance of bye-laws in local sanitary administration may be inferred from the subjects to which they relate. These briefly are as follows: the cleansing of footways, the removal of refuse, the removal of snow and dust, the keeping of animals, the regulation of privies of all sorts, ashpits and cesspools, of common lodging-houses, and of houses let in lodgings, of offensive trades, of mortuaries, of new buildings and their drainage, of recreation grounds, of markets, of slaughter-houses, of horse and ass letting, of pleasure-boats, of hop-pickers, of baths and wash-houses, of bathing, and of burial-grounds.

With regard to several of these subjects, and those the more strictly sanitary, the Local Government Board, the existing Central Sanitary Authority, has recently issued for the guidance of Sanitary Authorities a new series of forms of bye-laws—"*Model Bye-laws*"—which are intended to supersede the forms previously in use. These forms are of peculiar importance in several ways. While on the one hand they manifest a very sensitive care as to legality, on the other hand they exhibit a much broader conception of the requirements of local health self-government than the forms which preceded them. In other words, they are practically free from the *doctrinaire* character which affected so banefully the forms before in use. They are devised to meet the requirements of authorities and the needs of localities under very different conditions, and they aim at securing a high standard of local administration in the several subjects to which they relate. These model bye-laws, in fact, will serve a purpose entirely apart from that for which they are designed. They afford, indeed, an admirable summary of the sanitary principles and practice which ought to obtain among, and which may be compassed by local authorities in the present state of the law. This limitation by the existing law must be had in mind, for in the official circular letters accompanying the bye-laws it is not assumed that either the existing sanitary law, or the present draft of model bye-laws, is final. It must be also understood that the model-laws, notwithstanding their wide scope, are not submitted to local authorities as an arbitrary form. "If in any case," say the circular letters, "the model clauses require alteration to suit the special circumstances of a particular district," these alterations are to be submitted to the Local Government Board in a specified manner. "The Board will then be readily able to direct their attention to these variations, and to state their views upon the points which may arise."

The model bye-laws issued are printed in sections, forming handy pamphlets. This is for convenience of distribution to sanitary authorities, all of whom have not equal interest in the entire series. The several sections relate to the following subjects:—I. Cleansing of Footways and Pavements; Removal of House Refuse; Cleansing of Earth-closets, Privies, Ashpits, and Cesspools. II. Prevention of Nuisances arising from Snow, Filth, Dust, Ashes, and Rubbish; Prevention of Keeping of Animals on any Premises so as to be Injurious to Health. III. Common Lodging-houses. IV. New Streets and Buildings. V. Markets. VI. Slaughter-houses. VII. Hackney-carriages. VIII. Public Bathing; and IX. Public Baths and Wash-houses, and Open Bathing-places; and Duties of the Officers and Servants. Now with respect to these bye-laws sanitary authorities are divided into three categories. In the first are the Urban Sanitary Authorities, who may, if they so will, use the entire series of bye-laws. In the second category are the Rural Sanitary Authorities, who are restricted in their use of bye-laws to those which relate to the cleansing of footways and pavements adjoining any premises, the removal of house-refuse from any premises, the cleansing of earth-closets, privies, ashpits, and cesspools belonging to any premises, and to common lodging-houses. In the third category are included rural sanitary districts upon the local authorities of which the Local Government Board has conferred certain urban sanitary powers; such, for instance, as relate to the construction of water-closets, earth-closets, privies, ashpits, and cesspools, prevention of nuisances arising from filth, dust, ashes, and rubbish, &c. The diverse application of the powers, which are provided for by bye-laws, as at present exercised, is far from satisfactory, and fails fully to meet the necessities of rural districts, particularly such as are seats, or are likely to become seats, of new building operations.

A few illustrations will be sufficient to show the vast advance of the new model bye-laws upon the forms previously in use. Thus, for example, in the first section, relating to the removal of house-refuse and the cleansing of earth-closets, privies, ashpits, and cesspools, the form provides for a *weekly* removal of house-refuse from premises, a *weekly* cleansing of every privy, whether it have a fixed or a movable receptacle, and be conjoined with, or be without, an ashpit, a *weekly* cleansing of earth-closets with movable receptacles, and a *three-monthly* cleansing of such as have fixed receptacles; also a *three-monthly* cleansing of all cesspools. The noteworthy point here is the suggestion that the cleansing of privies shall be a *weekly* operation. The boldness of this proposition in view of the tenacity with which very many towns and rural districts adhere to long periods of accumulation of privy filth, almost takes the breath away. That there is any reasonable probability of these bye-laws as to privies being very largely adopted with this limitation of time as to cleansing, seems inconceivable. All the more honour to the Local Government Board, however, for taking this hitherto unmanageable subject by the horns. The Board is emphatically right in adopting this *weekly* period of cleansing. It will, no doubt, in so doing have brought a hornets' nest of angry sanitary authorities about its ears, but it is impossible that the formal expression of opinion on the subject, such as these model bye-laws must be regarded, should not exercise a most important influence upon the action of sanitary authorities. The Board may have to relax somewhat from the stringency of the provision in the model bye-laws, but it is probable that by these provisions it will have broken the neck of one of the gravest sources of unwholesomeness.

With respect to the collection of filth in the course of, or for the purpose of, carriage, the model bye-law provides that the collection shall not be permitted within a certain distance (to be defined) from inhabited dwellings, and for a certain space of time (also to be defined). In the same manner swine are not to be kept within a certain distance (to be defined) of dwelling-houses, or in a situation which might give rise to pollution of any water used for drinking or domestic purposes. Here very important principles of procedure for the prevention of nuisances are laid down for general adoption by sanitary authorities.

We regret that the model bye-laws relating to new streets and buildings (Series IV.) and to slaughter-houses (Series VI.) cannot, from their length, be reproduced here verbatim, they are so full of instruction, the one set as to sanitary principles and practice in the structural arrangements of buildings, the other set as to the prevention of nuisances in connection with slaughter-houses. No better illustrations can be given of the great care with which these model bye-laws have been framed than the sections which relate to the ventilation of drains, and (leaving open the question of weekly cleansing to which reference has already been made) the construction of privies.

The following are the model bye-laws with respect to the ventilation of drains :—

65. Every person who shall erect a new building shall, for the purpose of securing efficient ventilation of the drains of such building, comply with the following requirements :—

(i.) He shall provide at least two untrapped openings to the drains, and, in the provision of such openings, he shall adopt such of the two arrangements hereinafter specified as the circumstances of the case may render the more suitable and effectual.

(*a.*) One opening, being at or near the level of the surface of the ground adjoining such opening, shall communicate with the drains by means of a suitable pipe, shaft, or disconnecting chamber, and shall be situated as near as may be practicable to the trap which, in pursuance of the bye-law in that behalf, shall be provided between the main drain or other drain of the building, and the sewer or other means of drainage with which such drain may lawfully communicate. Such opening shall also in every case be situated on that side of the trap which is the nearer to the building.

The second opening shall be obtained by carrying up from a point in the drains, as far distant as may be practicable from the point at which the first-mentioned opening shall be situated, a pipe or shaft, vertically, to such a height and in such a manner as effectually to prevent any escape of foul air from such pipe or shaft into any building in the vicinity thereof, and in no case to a less height than *ten feet.*

(*b.*) In every case where the foregoing arrangement of the openings to the drains may be impracticable, there shall be substituted the arrangement hereinafter prescribed.

One opening shall be obtained by carrying up from a point, as near as may be practicable to the trap, which, in pursuance of the bye-law in that behalf, shall be provided between the main drain or other drain of the building and the sewer or other means of drainage with which such drain may lawfully communicate, a pipe or shaft, vertically, to such a height and in such a manner as effectually to prevent any escape of foul air from such pipe or shaft into any building in the vicinity thereof, and in no case to a less height than *ten feet.* Such openings shall also in every case be situated on that side of the trap which is the nearer to the building.

The second opening, being at a point in the drains as far distant as may be practicable from the point at which such last-mentioned pipe or shaft shall be carried up, shall be at or near the level of the surface of the ground adjoining such opening, and shall communicate with the drains by means of a suitable pipe or shaft.

(ii.) He shall cause every opening provided in accordance with either of the arrangements hereinbefore specified to be furnished with a suitable grating or other suitable cover for the purpose of preventing any obstruction in or injury to any pipe or drain by the introduction of any substance through any such opening. He shall, in every case, cause such grating or cover to be so constructed and fitted as to secure the free passage of air through such grating or cover by means of a sufficient number of apertures, of which the aggregate extent shall be not less than the sectional area of the pipe or drain to which such grating or cover may be fitted.

(iii.) Every pipe or shaft which may be used in connection with either of the arrangements hereinbefore specified shall be of a sectional area not less than that of the drain with which such pipe or shaft may communicate, and not less in any case than the sectional area of a pipe or shaft of the diameter of *four inches.*

(iv.) No bend or angle shall (except where unavoidable) be formed in any pipe or shaft used in connection with either of the arrangements hereinbefore specified.

(v.) Provided always, that for the purpose of either of the arrangements hereinbefore specified the soil-pipe of any water-closet, in every case where the situation, sectional area, height, and mode of construction of such soil-pipe shall be in accordance with the requirements applicable to the pipe or shaft to be carried up from the drains, may be deemed to provide the necessary opening for ventilation which would otherwise be obtained by means of such last-mentioned pipe or shaft.

Here the true principles of drain-ventilation are set forth with admirable clearness and precision. In the following model bye-laws as to privies, the principles of construction are not less clearly and precisely detailed:—

78. Every person who shall construct a privy in connection with a building, and shall construct such privy for the use in combination with a fixed receptacle for filth, shall construct or fix in or in connection with such privy suitable means or apparatus for the frequent and effectual application of ashes, dust, or dry refuse to any filth which may from time to time be deposited in such receptacle.

He shall construct such receptacle so that the contents thereof may not at any time be exposed to any rainfall or the drainage of any waste water or liquid refuse from any adjoining premises.

He shall construct such receptacle of such material or materials and in such a manner as to prevent any absorption by any part of such receptacle of any filth deposited therein or any escape, by leakage or otherwise, of any part of the contents of such receptacle.

He shall construct such privy so that the bottom or floor thereof shall be in every part at least *three inches* above the level of the surface of the ground adjoining such privy.

He shall not in any case construct such receptacle of a capacity exceeding *eight cubic feet.*

He shall construct the seat of such privy so that the whole of such seat, or a sufficient part thereof, may be readily removed or adjusted in such a manner as to afford adequate access to such receptacle for the purpose of removing the contents thereof, and of cleansing such receptacle, or shall otherwise provide in or in connection with such privy adequate means of access to such receptacle for the purpose aforesaid.

79. A person who shall construct a privy in connection with a building shall not cause or suffer any part of the space under the seat of such privy, or any part of any receptacle for filth in or in connection with such privy to communicate with any drain.

These are but examples of the excellent stuff found in the "model bye-laws." These bye-laws bear abundant evidence that the unrivalled technical experience at the command of the Local Government Board within its own office—legal, architectural, engineering, and medical—has been brought fully to bear upon them. Moreover, the Board has had the wisdom to go outside its office to seek for additional knowledge in some of the matters for which it has had to frame bye-laws. Thus it sought the aid of the Royal Institute of British Architects in respect to the regulation of new streets and buildings, the Commissioners of Police of the metropolis in respect to hackney carriages and common lodging-houses, and the authorities of the City of London in respect to markets. Thus the model bye-laws represent the results of an amount of experience on the several subjects to which they refer which could not well be surpassed. The action of the Local Government Board in the matter of these model bye-laws, so far as it may be inferred from these details and is confessed, leads to the hope that the miserable shortsighted policy hitherto pursued by the Board of shunting its technical advisers in the administration of the department of Government which it controls, except as correctors of blunders which ought never to have occurred, is coming to an end.

# THE REGISTRATION OF INFECTIOUS SICKNESS:— TWO MUNICIPAL EXPERIMENTS.

Two municipal experiments relative to the registration of infectious sickness are now being made in this country, the results of which cannot fail to exercise an important influence upon the question of the advisability and practicability of such registration as a general measure, and even indirectly upon the wider question of a registration of all sickness. The Corporations of Huddersfield and Bolton have each recently sought and obtained from Parliament authority to institute a registration of infectious sickness within their respective boroughs. The municipal borough of Huddersfield, situated in the West Riding of Yorkshire, has a population of 70,253; the municipal borough of Bolton, situated in Lancashire, has a population of 82,853. The provisions of the Act of Parliament under which the authority for this registration has been granted, and with reference to the scope of such registration, differ considerably in the one case from the other. Thus, in the Huddersfield Act the registration is to include cases of "small-pox, cholera, or any contagious or infectious fever of a dangerous character," where the patient is "without proper lodging or accommodation enabling the case to be properly isolated so as to prevent the spread of the disease or the proper treatment thereof." In other words, the Huddersfield Corporation appears to contemplate through this provision a more effective administration of the 124th section of the Public Health Act, 1875, so far as this refers to persons "without proper lodging or accommodation." On the other hand, the Bolton Act provides for the registration of "small-pox, cholera, or any contagious or infectious fever" (the phrase "of a dangerous character" not being used) without reference to the state of lodging of the patient. In other words, the provision is for a general registration of infectious sickness in the borough within the category of the diseases specified. In the Huddersfield Act the responsibility (under penalty) of informing the Corporation (the Sanitary Authority) of the existence of the sickness is thrown upon the heads of families or the occupiers, or persons in charge, of houses in which the sickness occurs, the persons in charge of the patient, or the patient himself, if able; and the medical man in attendance is required (also under penalty) to give to one or other of the persons referred to a certificate, according to a form to be provided by the Corporation, of the sickness. In the Bolton Act the medical man in attendance as well as, and in addition to, the head of a family, or the occupier or person in charge of a house, is required (under penalty) to give information to the Corporation. Again the Huddersfield Act requires that the medical certificate shall simply state that the sickness comes within the particular provision of the Act under which it is given; but the Bolton Act requires that the certificate shall state the "nature" of the disease. Both Acts provide that the medical practitioner giving the certificate shall receive a fee of two shillings and sixpence for each certificate.

We subjoin the provisions of both Acts relating to the registration of infectious sickness.

## THE HUDDERSFIELD WATER-WORKS AND IMPROVEMENT ACT, 1876.

SECTION 67. In order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation who is suffering from small-pox cholera or any contagious or infectious fever of a dangerous character and who is without proper lodging or accommodation enabling the case to be properly isolated so as to prevent the spread of the disease or the proper treatment thereof the following provisions shall have effect (that is to say) :—

The Corporation shall provide and supply gratuitously to every registered medical practitioner resident or practising in the borough forms for the certificate or declaration by such medical practitioner of the particulars hereinafter mentioned in relation to such cases according to the form set forth in the Third Schedule to this Act.

Every medical practitioner attending or called in to visit such inmate shall on becoming aware that such inmate is suffering from any such disease as aforesaid forthwith fill up sign and deliver to the occupier or other person having the charge management or control of the building or room wherein such inmate is a certificate or declaration stating according to the forms prescribed and supplied to him by the Corporation the name of such inmate the situation of such building and the name of such occupier or person.

The Corporation shall pay to every medical practitioner who shall in pursuance of this section duly make and give any such certificate or declaration a fee of two shillings and sixpence for each such certificate of declaration.

The person to whom such certificate or declaration shall be given shall forthwith deliver the same at the sanitary office or police station of the Corporation to such officer clerk or servant of the Corporation as he shall find in attendance there.

If no medical practitioner be in attendance on or called in to visit such inmate then such inmate on becoming aware of the existence in himself of such disease and the occupier or person having the charge management or control of such building or room on his becoming aware of the existence of such disease in such inmate shall forthwith give or cause to be given notice thereof at the sanitary office or police-station of the Corporation to such officer clerk or servant of the Corporation as he shall find in attendance there.

And any person who shall offend against this enactment (unless ignorant thereof the burden of the proof of which shall be on him) shall for every such offence be liable to a penalty not exceeding five pounds.

## THE THIRD SCHEDULE.

### CERTIFICATE OF DISEASE, &c., UNDER SECTION 67.

*Huddersfield Water-works and Improvement Act*, 1876.

### SECTION 67.

To the Corporation of the Borough of Huddersfield.

Pursuant to the above-mentioned Act I hereby certify and declare that in my opinion the under-mentioned person is suffering from a disease within the terms of such section.

Dated the day of 18 .
(Signed)

Name of person suffering from the disease.
Situation of the building wherein such person is.
Name of occupier or other person having the charge management or control of the building or room.

N.B.—This certificate must (under penalty of £5 in case of neglect) be forthwith taken by the occupier or other person having the charge management or control of the building or room wherein the inmate suffering from the disease is to the sanitary office or police-station of the Corporation and delivered to the officer clerk or servant of the Corporation who shall be found in attendance there.

## THE BOLTON IMPROVEMENT ACT, 1877.

SECTION 87. In order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation who is suffering from small-pox cholera or any contagious or infectious fever the following provisions shall have effect (that is to say):

(1) If any such inmate be suffering from any such disease as aforesaid the occupier or person having the management or control of such building shall as soon as he shall become aware of the existence in any such inmate of any such disease forthwith give notice to the Corporation at the town hall of the existence in such inmate of such disease.

(2) If such inmate be not a member of the family of such occupier or person the head of the family (resident in such building) to which such inmate belongs or if there be no such head then such inmate (unless prevented by reason of such disease or of youth) shall on becoming aware of the existence in such inmate or in his own person as the case may be of such disease forthwith give notice thereof to such occupier or person.

(3) The Corporation shall provide and supply gratuitously to every registered medical practitioner resident or practising in the Borough forms for the certificate or declaration by such medical practitioner of the particulars hereinafter mentioned in relation to such cases according to the form set forth in the Fifth Schedule to this Act.

(4) Every medical practitioner attending on or called in to visit such inmate

shall on becoming aware that such inmate is suffering from any such disease as aforesaid forthwith fill up sign and send to the Corporation at the town hall a certificate or declaration stating according to the forms prescribed and supplied to him by the Corporation the name of such inmate the situation of such building and the name of such occupier or person and the nature of the disease from which such inmate is suffering.

(5) The Corporation shall pay to every medical practitioner who shall in pursuance of this section duly make and give any such certificate or declaration a fee of two shillings and sixpence for each such certificate or declaration;

And any person who shall offend against this enactment (unless ignorant thereof the burden of the proof of which shall be on him) shall for every such offence be liable to a penalty not exceeding ten pounds.

## THE FIFTH SCHEDULE.

### CERTIFICATE OF DISEASE UNDER SECTION 87.

*Bolton Improvement Act,* 1877.

SECTION 87.

To the Corporation of the Borough of Bolton.

Pursuant to the above-mentioned Act I hereby certify and declare that in my opinion the under-mentioned person is suffering from a disease within the terms of such section.

Dated the day of 18 .
(Signed)

Name of person suffering from the disease.
Situation of the building wherein such person is.
Name of occupier or other person having the charge management or control of the building or room.
Nature of the disease.

NOTE.—This certificate must (under penalty of five pounds in case of neglect) be forthwith sent to the Corporation at the Town Hall and delivered to the official clerk or servant of the Corporation who shall be found in attendance there.

# THE ÆTIOLOGY OF DIPHTHERIA.

A REPORT dealing in an exhaustive manner with an extensive epidemic of diphtheria has been recently issued by the Local Government Board. The epidemic occurred at Great Coggeshall, in Essex, and was the subject of a lengthened investigation by Dr. Thorne Thorne, from whose report we gather the following details.

The outbreak commenced in November, 1875, and continued almost without cessation until the end of 1876, by which date there had been 170 attacks in a population of about 3,300. During the first four months there were thirty cases, fifteen of which terminated fatally. At first the disease was not recognised as diphtheria, and the first seven deaths were registered as due to "croup;" after this, however, the true nature of the disease became evident, and all fatal cases were returned as due to diphtheria. Dr. Thorne, however, satisfied himself that the early cases were diphtheria, although of the laryngeal type, and in confirmation of it he shows amongst other things that it was from the first of an infectious character. About the beginning of March the cases became much more numerous, twenty-three occurring during that month. The disease, however, in several respects, changed its character, and the attacks were in many instances of a trivial nature. This peculiar characteristic was maintained up to the end of October, when as many as 126 attacks had occurred, and of these there had, in addition to the fifteen fatal cases at the beginning of the outbreak, been only six deaths.

In some cases only ordinary signs of inflamed fauces could be found, and had it not been for the intensely infectious nature of the disease, and for the fact that the mild cases were often preceded or followed by, or occurred synchronously with, cases of well-marked diphtheria in the immediate vicinity, and at times in the same household, the affection might easily have escaped notice.

During the months of April, May, June, and July, the number of attacks was comparatively small, only twenty-two being known of, but in September the number of cases rapidly increased, the increase being maintained up to the end of the year, ninety-eight cases in all occurring from the 1st of September to the end of December.

In dealing with the ætiology of the disease, its origin is first gone into. Much time seems to have been spent in endeavouring to ascertain whether it was due to any antecedent case, but no such case could be heard of. With regard to the existence of other diseases liable to affect the throat, and in that way having more or less affinity with diphtheria, it appears that both Great Coggeshall and the surrounding district had for some time been remarkably exempt from any such affections. There had also been no special diseases among cows, thus affecting the milk-supply. With respect to the sanitary circumstances of the place, nothing very definite could be made out, and it is certain with regard to the houses first attacked that no known sanitary defects were common to them.

Viewing however all the circumstances elicited, and especially the mild nature of many of the cases, Dr. Thorne saw no reason for absolutely dating the outbreak from November, 1875, and he expresses with some confidence the opinion that the first case or cases had not been arrived at. The first recorded cases could not be shown to be due to antecedent cases; but all through the epidemic the origin of the disease in individuals could not be shown to have been exclusively due to such a cause.

With reference to the spread of the disease when once in existence, infection appears to have played a large part. This point is very conclusively brought out, and one series of cases afford so striking an instance of it that we subjoin it:—

Lying in the parish of Little Coggeshall, about one mile from the town of Great Coggeshall, is a superior farmhouse. The family residing there consists of the parents, six children, varying in age from 11 years to six months, and two maidservants. Of the children the two eldest are boys, Ernest and Frank, aged respectively 11 and 9 years, who go twice a day to a school at Great Coggeshall, returning home for their mid-day meal. On the 26th of July, 1876, Frank (Case No. 65) came in ailing; he soon vomited; and within four and twenty hours his tonsils, uvula, and pharynx exhibited patches of greyish exudation; there was also considerable swelling of the glands under the lower jaw, with marked febrile disturbance and prostration. Ernest (Case No. 66) was attacked with similar symptoms on the 5th of August, and in his case the disease must either have been contracted at Great Coggeshall, where he continued his school attendance, or by infection at home from his brother. Owing to Frank's protracted convalescence the mother took the two boys to the seaside from August 14th to 28th; Ethel, aged seven years, and Reginald, aged five years, also accompanying them. On the 29th of August, the day after their return home, Ethel (Case No. 71) was attacked in a similar manner to her brothers, but in addition there were symptoms indicating obstruction of the posterior nares, accompanied with nasal discharge of a very persistent nature. Seven days after the date of the attack Reginald (Case No. 81) fell ill, and as in the other cases, there were distinct indications of severe throat mischief; but no evidence is forthcoming as to the presence or not of deposit. After the lapse of another seven days the mother (Case No. 83) had a similar but a mild attack. Nearly three weeks after this, *i.e.* on September 30th, the nursemaid, aged 14 years (Case No. 100), fell ill. The attack in this instance came on suddenly, with vomiting and profuse epistaxis, and was, both as regards the throat and general symptoms, of marked severity. There was, however, no medical attendance in the case, and, therefore, no trustworthy information could be obtained as to the nature of throat mischief; but when I saw the girl on the 28th of October the tonsils appeared as if they had recently been deeply ulcerated. From the 4th to the 6th of October this family was visited by an adult relation residing in the suburbs of London, and he, after his return home, was attacked on October 8th with pain on swallowing, and an "inflamed and ulcerated sore throat" of about 10 days' duration (Case No. 108). He had three children, aged respectively 13 years, 9 years, and 7 years. On the 15th of October the one aged 7 years (Case No. 113), and on the 17th the one aged 9 years (Case No. 114), were attacked with what are stated to have been similar symptoms. Unqualified medical attendance had been employed in these three cases, so that no more detailed information could be obtained.

The last patient at this farmhouse in Little Coggeshall having been well for nearly three weeks, it was thought that there would be no risk in inviting four children to tea on the 26th of October. Two of them, aged eight years and five years respectively, came from a neighbouring farm, standing in an isolated position in the same parish. On the 29th the child aged eight years, and on the 30th the one aged five years (Cases No. 123 and 124) were taken ill. The cases were pronounced to be cases of diphtheria, and when seen by myself on November 3rd, both the children exhibited slight but characteristic deposit on the fauces. I am assured that these children for months prior to their attacks had not been in Great Coggeshall except when they had driven through with their parents. They have a resident governess and they rarely leave the immediate neighbourhood of their own home. On the 4th of November the mother of these children (Case No. 131) was seized in a similar manner. Her general symptoms were more severe than those of either of her children, and were associated with thick grey deposit on the left tonsil, together with general inflammation of the fauces. The mother having apparently recovered, two of her children, a boy and a girl, who had been sent away when the first attacks in this house took place, returned home about the middle of November, and within about three days (November 18th ?) the boy aged four years (Case No. 135) was attacked with diphtheria. On the same or the next day (November 19th ?) a servant-maid in the house (Case No. 137) was also attacked. In both of these cases the symptoms were of a comparatively mild type. The last of these patients having been well for about three weeks, another child, a boy aged 10 years, who had been at school away from home, returned on the 19th of December. On the 23rd he also was attacked (Case No. 168); in this instance, however, the symptoms were of great severity, the fauces were covered with thick deposit, and the case terminated fatally.

The influence of schools in the spread of the disease is also dealt with, and it was ascertained that after making every allowance for the circumstance that diphtheria specially tends to attack children between the ages of three years and fifteen years, namely, that at which school attendance is most common, the school influence did unquestionably aid in the spread of the disease. A larger number of attacks took place in the female than in the male sex; but it is stated as the result of the inquiry, that this may very possibly be due to the circumstance that males in youth and adult age spend much less of their time in infected homes and amongst the sick than girls and women do, and then this would become simply a question of more or less exposure to infection.

The question of the effect of site, soil, and climate in favouring the spread of this disease is one which has recently received much attention, and the results obtained in this investigation, so far as they are positive, may confirm the experience gained by other recent observers as to the association of diphtheria with conditions of cold and wet. The whole place is remarkable for the dampness of its site. The variation in the proportion of attacks to the different soils in which the houses stood was not found to be sufficiently marked to warrant inference being drawn from it. Thus of the houses standing on sand and gravel 14·5 per cent. were attacked, of those situated on London clay, 16·8 per cent. were attacked, and of the remainder, which occupied the outskirts of the place and were on Boulder clay, 10 per cent. were attacked.

The effect of temperature and rainfall on the spread of the disease was much more marked, and from the tables which Dr. Thorne has prepared, it is seen that the largest number of attacks occurred during the months of excessive rainfall, and of comparatively low temperature, whereas with a rising thermometer and diminished rainfall the number of attacks became smaller. The sudden spread of the disease both in March and in the last four months of 1875 is especially noteworthy, as being associated with periods of unusually large rainfall, especially as the marked subsidence of the epidemic during the five months April—August coincided with a rainfall of nearly three inches below the average.[1]

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[1] These points are shown in the following table :—

| Date. | Number of Fresh Attacks. | Rainfall in Inches. | | Mean Temperature per Month in 1876, in Degrees Fahrenheit. |
|---|---|---|---|---|
| | | Per Month in 1876. | Average per Month for 25 Years, 1850–75. | |
| 1876. | | | | |
| January ... ... | 8 | 1·32 | 2·22 | 35° |
| February ... | 8 | 2·36 | 1·43 | 40° |
| March ... .. | 23 | 3·14 | 1·67 | 39° |
| April ... ... | 2 | 1·78 | 1·48 | 46° |
| May ... ... | 7 | 0·77 | 1·91 | 47° |
| June ... ... | 1 | 1·53 | 2·09 | 55° |
| July ... ... | 5 | 1·48 | 2·45 | 65° |
| August ... ... | 7 | 1·67 | 2·08 | 62° |
| September ... | 28 | 3·46 | 2·31 | 54° |
| October ... ... | 26 | 1·18 | 2·68 | 52° |
| November ... | 20 | 3·01 | 2·09 | 42° |
| December ... | 24 | 5·68 | 1·79 | 41° |

Investigation into the effect of the general sanitary circumstances on the spread of the epidemic was rendered difficult because sanitary defects of the most glaring character were so general throughout the place. It was, however, noticeable as regards a very large proportion of the class attacked, that their homes were ill-ventilated and overcrowded, and that in addition to the ordinary nuisances due to the generally imperfect sanitary arrangements of the town, they were characterised by that special want of cleanliness so often associated with overcrowding and destitution.

The absence of immunity to a second attack of diphtheria afforded by a prior attack has often been noted. The evidence as to this which was forthcoming in this epidemic went further to show that no long interval need elapse between two attacks in the same person. In two instances, up to the end of December 1876, second attacks occurred in Great Coggeshall. In one case a boy aged eight years had a comparatively mild, though an unquestionable, attack at the end of March, 1876, and he was again attacked on the 11th of December, 1876. In the other instance, a girl aged 11 years had diphtheria in October, 1876; she rapidly recovered, but on the 28th of December she was again attacked. In each of these instances the second attack was far more severe than the first, and in the case of the girl it terminated fatally.

This epidemic, which was still in progress at the date when the report closes, is one of the most remarkable which has been placed on record; and although but little positive information was arrived at by which any one condition or set of conditions could be identified as unquestionably affecting the origin or the spread of the disease, the history of the outbreak will by its completeness be of great value for the purposes of reference, and as indicating the directions in which similar investigations should be made.

# THE PRACTITIONER.

DECEMBER, 1877.

## Original Communications.

# A CASE OF PROLONGED SYNCOPE WITH CEREBRAL DISTURBANCE, TREATED BY NITRITE OF AMYL.

BY WILLIAM O'NEILL, M.D., M.R.C.P.,

*Physician to the Lincoln Lunatic Hospital.*

On the 4th of September I was sent for in great haste to see Mr. W., who, it was represented, was in a fit. This gentleman, who is about 65 years of age, has been under my care, on several occasions, for disease of the heart (hypertrophy and dilatation) with great irregularity of the pulse. On the day above stated, being much fatigued from walking and transacting business, he called at the house of a friend, to one of the inmates of which he complained of pain and a sinking sensation in the region of the stomach, and whilst some stimulant cordial was being prepared for him, he sank on a seat, leaned forward, attempted to vomit, and then became insensible. When I saw him about half an hour after the seizure he was sitting supported on a couch by a person who sat beside him, and who prevented his head from falling forward on his chest. He was quite insensible, and breathed in a peculiar shallow way, giving a deep gasp or sigh every few minutes. The eyes were shut, and the countenance had assumed a deathlike pallor. The head, extremities, and indeed the whole body felt as cold as ice, and were saturated with a clammy sweat. The pulse could not be felt, but I could hear the heart beat faintly and irregularly. The teeth were firmly clenched, and he had passed a most offensive motion under him.

For several hours the patient was not moved from the sitting position in which I found him for fear of extinguishing the little breathing power left. From this cause then, and from his insensibility, and from the clenching of his teeth, I was not able to give anything—either by the mouth or anus—but the extreme coldness of the patient suggested the application of warmth to the surface, and very fortunately the appliances for doing so were at hand. I therefore ordered his feet and legs to be gently put into a deep tub of hot water and mustard, his hands and arms to be laid on a hot oven shelf enveloped in flannel, his thighs and body to be surrounded as far as practicable with bottles of hot water, and ammonia to be held to the nostrils. Whilst all this was being done I procured some nitrite of amyl, but as I was about administering it the patient's breathing ceased, and I, as well as the relatives about him, thought he was gone. After some seconds, however, he gave a deep gasp, and that gasp drew a good whiff of the amyl into his lungs, and the breathing, such as it was, to our satisfaction was again restored. At first I administered the amyl on a handkerchief, gradually giving larger and more liberal doses, but finding that I did not make very much progress in this way I applied the unstoppered bottle to the nose. I thought, as the saying is, I would give the medicine "a fair trial," and a fair trial I gave it, to the saving, I believe, of the patient's life. In this way, off and on, from four o'clock in the afternoon till nearly twelve o'clock at night, in order to keep up its good effects, I kept administering the amyl, and I believe I could not have used much less than two drachms of it from first to last. Until I gave it from the bottle freely there was no very marked appearance of flushings of the face, or much amelioration of his state, but with the flushings came gradual improvement of symptoms, and gradual heat of head, hands, feet, and body. About ten o'clock the breathing and general condition had so much improved we were able to lay him down on a couch with his head on some pillows, and about the same time he was able to swallow a few teaspoonfuls of fluid, but perfect swallowing and speech had not returned till seven o'clock on the following morning. At nine o'clock, when I called, his breathing and pulse were better than usual. He was feverish and his face was as red as scarlet. The redness of the face and the feverish state remained for a day or two, and then gradually disappeared.

In the treatment of this case the warm applications were most salutary adjuvants, but to the repeated and persistent use of the nitrite of amyl I attributed mainly the gentleman's recovery. It is now nearly three years since I first saw the great benefit which could be derived from the judicious employment of the drug, from having had occasion to administer it by inhalation to a patient suffering from intense renal dropsy with great orthopnœa, the breathing during the last few weeks of this patient's life assuming that character first described by Dr. Cheyne. This poor man derived the greatest comfort and relief from time to time from the inhalation of four or five drops of the amyl. On several occasions it seemed to restore and reinvigorate in a most extraordinary way the flickering breathing when it was apparently about to cease.

I do not make any comment as to the nature of the seizure in this most interesting case of Mr. W., further than to say that from the beginning of the syncopal attack to the end of it the patient presented no symptoms of paralysis either local or general, and that the cerebral symptoms were caused, I believe, more from a deficiency of blood to the brain than by a superabundance of that fluid.

# SOLID FOOD IN TYPHOID FEVER.

(*A Reply to Professor Turney.*)

BY DYCE DUCKWORTH, M.D., F.R.C.P.,

*Assistant-Physician to St. Bartholomew's Hospital, Examiner in Practice of Physic in the University of Edinburgh.*

I DESIRE to express my strong dissent from the views of the American Professor, which are set forth on this subject in the *Practitioner* for November. Professor Turney, it seems to me, is inculcating a most perilous practice in urging the use of solid food "as early in typhoid fever as possible." He refers to a suggestion of this practice made more than twenty years ago by an American physician. Now I beg leave to doubt very much whether the true nature of typhoid fever was understood in Connecticut at that period. Such was certainly not the case in England to any important extent at that time. If this be so, then any views on the dietetics of typhoid fever laid down then can now be of no value whatever; nay, more, may be, as they distinctly are in this instance, simply misleading and mischievous.

The idea of giving *solid* food at any stage of typhoid fever certainly could not enter the mind of any well-educated and experienced physicians.

Does Professor Turney imagine that the vast and laboriously-gathered experience of this disease in the fever and other hospitals of London and of other cities is to be set aside upon his suggestion? I doubt if the profession in Great Britain and Ireland is more agreed upon any one point than upon the notorious risks of such a practice as he enjoins. *One* fatal case proved to be due to such practice should for ever check any such injudicious treatment. I have, in my own experience, known the too early exhibition of even pultaceous food bring on relapses of fever, and severe increase of diarrhœa, and have witnessed several deaths due to the giving of solid food before ulceration had ceased.

Professor Turney does not specify the actual method of dietetics he employs. But he speaks of the arrest of salivary, gastric, pancreatic, and intestinal juices, as if the absence of solid food induced this inhibition, and states that the use of solid food *alone* will maintain the glandular organs that secrete these juices in their full physiological vigour. This is altogether incorrect, and the Professor ought to know that the condition of fever *alone* is to blame for the arrest of all these physiological functions, and hence, for example, the reason for the imperfect digestion of amylaceous matters which is so well recognised during the fever-process.

At the end of his paper the Professor insists upon the "intelligent consent" of the patient to his practice. What a comfort to think that Nature is so often kinder than the doctor, and that this intelligence is not forthcoming in severe cases!

Lastly, Professor Turney tells us that milk is a *solid* food. This induces me to hope that after all his practice may not be so very different from that of most rational physicians, still I cannot but have misgivings as to this, for he concludes his remarks with the sentence, "Milk alone cannot take the place of solid food."

I trust that others whose opinions shall carry far more weight than mine may write on this subject, and thus prevent the pages of the *Practitioner* from becoming the medium of circulating such dangerous doctrine.

I take it that the method of diet for adoption in all cases of typhoid fever is fully understood, and, on the whole, carefully practised in this country, and that it rests moreover upon the basis of honestly-acquired clinical experience.

# ON SLEEPLESSNESS AND ITS TREATMENT.

BY W. AINSLIE HOLLIS, M.D.

A PAPER on sleeplessness almost necessarily requires a few words on sleep. One-third of our lifetime nearly is passed in this condition. In the waking state a large percentage of our blood, that is to say about one-fifth of the whole quantity, circulates within the vessels of the brain. This quantity is diminished in sleep. Confusing effects and causes, some have striven to prove that sleep depends on this want of blood to the brain. Many facts oppose such a theory. A man dying from loss of blood faints, but does not necessarily sleep. Syncope is not sleep. Chlorosis, with its attendant blood-poverty, is frequently accompanied with a distressing wakefulness. A refreshing nap, again, seldom relieves the languor of well-marked anæmia. I need not, however, multiply instances of this absence of sleep in such cases.

Noticing the failure of such attempts to make sleep the result of an exsanguine brain, physiologists have sought the causes elsewhere, in the brain-cells themselves. Every muscular organ has a period of rest alternating with one of activity, in which an increased flow of blood passes through its vessels. Is it not then probable that the wakeful brain should have a larger supply of blood than does the sleeping organ? If, however, we compare closely the conditions under which blood circulates in a muscle and in the brain, we shall find them very different. In the one case we have the vascular dilatation, and consequently blood-supply, practically unchecked by other means than the tension of the coats of the vessels themselves. In the second case, the whole blood-system, together with the nourished tissues, are inclosed in an unyielding bony structure, and further divided by tensely-stretched membranes. Experience shows that the skull naturally exerts considerable mechanical pressure on its contents during the waking state. If we trephine the skull-cap, we shall find the brain welling upwards through the opening as soon as the animal wakes and exerts itself. This protrusion of brain-substance, which cannot of course take place naturally, has laid the foundation for an elaborate theory of sleep, to which I have already alluded. Many of the phenomena observed by Durham and Hammond could not possibly have occurred if the skull had been left in its entirety. The blood streaming through the brain is doubtless somewhat less in quantity during sleep than at other times. Yet any great change in the carrying capacity of the cerebral blood-system is from the nature of the case incompatible with a healthy functional activity of the brain itself. No general engorgement of the encephalic vessels can probably take place without an undue compression of the delicate nerve-tissues surrounding them. Local variations in the vascular calibre through the organ may, however, be considerable without great compression to the brain-tissues, and they possibly take place frequently. We must not, therefore, compare too closely the blood-circulation in an active muscle with that of the waking brain, although it has been customary to do so.

From what I have said we may presume that very slight changes in the calibre of the brain-vessels will affect the functional relations of the organ. Increased blood-supply, though local and small in amount, may possibly produce wakefulness. The quantity of blood passing though the brain in any given unit of time depends necessarily upon two factors, the calibre of the intracranial vessels, and the rate of the blood movements.

The calibre of the cerebral vessels is determined by branches of the vaso-motor system, supplied to some extent by the upper cervical ganglion. Any cause which depressed or enfeebled these vaso-constrictors might produce wakefulness. Dr. Duckworth believes that paresis of these nerves from exhaustion is one of the causes of this distressing ailment. The wakefulness consequent on anxiety or worldly disappointment is due to this loss of vascular tone in the cerebral vessels.

Another cause of wakefulness arises from impressions made upon our organs of sense. Pflüger has given many reasons for his belief that the waking state requires for its maintenance a continual stimulation of the higher nervous centres by impressions conveyed to the brain along the centripetal fibres. When we forcibly hold an animal in one position for a short period, and at the same time exclude to some extent light and noise, it will remain motionless even when our hands are withdrawn. This condition, Heubel has shown by experiments upon frogs, is one of true sleep. A noisy infant, as I have repeatedly ascertained, can be put to sleep in a quiet room by gently holding its limbs for a short time in one position. Unfortunately the man does not always remove the outer world from his brain by excluding external sense-impressions, or sleep would be easily wooed and won by us all. Experiments undertaken with a view to elucidate the phenomena of sleep as they occur in the lower animals, although interesting physiologically, are necessarily of little value to the practical physician in his treatment of insomnia. Loud noise, a strong light, or violent pain, may be instanced as external sense-impressions not conducive to sleep. On the other hand, a subdued recurrent sound, or the gentle shampooing of one's limbs promotes somnolence. The former possibly acts by tiring the organs of hearing, the latter by promoting an increased supply of blood elsewhere than to the brain.

Amongst the sense-impressions productive of wakefulness is a disagreeable epigastric sensation due to the flatus of dyspepsia. This symptom, with headache and parched mouth, is a legacy bequeathed specially to the eaters of hot suppers and fashionable dinners. Cullen alludes to this form of dyspepsia as occurring to himself and to Dr. Haller. Duckworth, who mentions this circumstance, believes that these gastric symptoms always denote an error of diet recently committed. I, however, consider that nocturnal dyspepsia frequently implies a weakness or exhaustion of the digestive organs, and a deficient secretion of the gastric or other peptic fluids. Wakefulness and indigestion occasionally follow an evening repast of the plainest description. They then both depend possibly on one and the same cause—the stimulation of a wearied organ to make undue because unseasonable efforts.

A change in the velocity of the blood-stream through the vessels of the brain is a more frequent cause of wakefulness than is usually asserted. From what I have said respecting the circulation of the brain, I take it that if a slight excess of blood finds its way into the encephalic vessels, one of two results will follow: either an over-distension of some vessel locally with symptoms resultant therefrom, or an increased velocity of the blood-current generally through the brain.

The "irritable heart," combined, as it frequently is, with hypertrophy, leads to insomnia by its action on the cerebral circulation. This affection was frequently observed by Da Costa of Philadelphia among the Federal soldiers during the Civil War. The cardiac disease followed the nervous excitement and exhaustion consequent on a prolonged campaign. Rapid action of the heart with palpitation, dizziness, pain in the chest, and disturbed sleep, are the prominent symptoms. Again a weak dilated heart frequently causes wakefulness. Patients having this disease suffer from cold extremities. This condition increases the amount of blood in the central organs. We find congestion of the liver and lungs in these cases. But an excess of blood which induces a distension of the relaxed pulmonary vessels, and a retardation of the blood-current within them, will act primarily on the speed of the blood-stream through the brain, increasing its velocity, and so relieving the organ from the serious evils of excessive compression. I do not deny that subsequently local congestions and œdema may take place in the brain; but such changes develop well-marked symptoms in addition to or in place of mere wakefulness.

The wakefulness of anæmia is ascribed by Willemin to changes in the nervous elements of the brain and a consequent modification of the circulation therein. If, as Pflüger and Durham suppose, the chemical products of the brain-action interfere with the continuance of the action by which they are produced, we can understand how certain blood-changes will lead to an undue accumulation of such products in the brain-cells. This accumulation must speedily bring about alterations both in the structure and functions of the cerebral matter.

Having briefly reviewed the principal causes of sleeplessness, I shall proceed to describe its treatment. We may classify this portion of the subject under two heads :—

1. The Induction of Natural Sleep.
2. The Production of Narcosis or Artificial Rest.

One of the most efficient means of inducing natural sleep is by the application of mustard poultices to the abdomen. In cases where sleeplessness arises from natural worry, abdominal flatus, or other annoyances, this remedy is invaluable.[1] Schüler states that large sinapisms applied in this way produce first dilatation and subsequently contraction of the vessels of the pia-mater in trephined animals. They may thus act as do pediluvia and warm compresses to the abdomen, by diminishing the amount of blood in the brain. The same writer says that cold abdominal compresses and the cold-pack produce at first dilatation of these vessels, and subsequently bring about an energetic contraction of the cerebral vessels, which lasts for some hours. M. Schüler explained these changes in the supply of blood to the pia-mater as the result of a constriction or dilatation of the peripheral current-areas of the skin. The subsequent phenomena which occur with long duration of the applications, and which are exactly opposite to the initial phenomena, may be explained by the changes in the conditions of the cutaneous vessels and their consequences.[2]

Preyer, of Jena, has advocated the administration of freshly made solution of lactate of soda for the production of sleep. About three drachms of carbonate of soda dissolved in warm water are neutralised by the addition of lactic acid. The solution may be given as a drink with sugar of milk or extract of beef. It usually induces sleep. He also states that the administration of a quart of fresh or sour milk, or better still of sour whey, was sufficient to induce a healthy sleep. Preyer's hypothesis is that sleep may be brought on by the introduction of the fatigue products of the body. L. Meyer has to some extent confirmed these experiments.

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[1] A cleanly and at the same time efficacious manner of making the sinapism is to steep a piece of spongio-piline in hot water, squeeze it nearly dry, and dust over it rapidly some mustard-powder.

[2] *Deutsch. Arch. f. Klin. Med.* xiv. ; *Corresp. Blatt. der Artz. ; Vereine in Rheinland, etc.* 1874 ; *Berliner. Klin. Woch.* 1874.

Where the insomnia depends upon brain exhaustion, I have found (with Duckworth) that the administration of a tumbler full of hot claret and water, to which has been added sugar and nutmeg, is of great value. Both the syrup and the spice in this instance are hypnotics, according to Preyer and Cullen. The mixture must be taken just before bedtime. In slight cases of wakefulness (as we all know) the reiteration of certain word sounds mentally, at the same time drawing a slow and deep inspiration between each word, is occasionally sufficient to produce sleep.

When sleeplessness is associated with acid dyspepsia, the alkalies and alkaline earths, especially the carbonate of magnesia and bicarbonate of soda, are very useful. In cases where the indigestion is owing to a sluggish peristalsis of the stomach and upper intestines, a full dose of Gregory's powder, or ten grains of the compound rhubarb pill, will remove the disagreeable epigastric sensation and induce sleep.

The posture of the sleeper is of some importance. Many persons can sleep in their armchairs by the fireside, who court the fickle god of sleep in vain when lying upon their beds, some few hours later. The posture of the dozer and the surroundings of such a fireside nap sufficiently account for his somnolence on physiological grounds. When sleeplessness results from an overworked brain and consequent paresis of the vaso-motor nerves, the stimulus of electricity has been resorted to. Althaus recommends this treatment. Two large pads are used with a Weiss's constant battery of from ten to fifteen cells. One pad is placed over the nape of the neck, the other, which can be conveniently made of an old reflector and covered with chamois leather, is placed over the stomach. The anode is applied to the back, the kathode to the stomach for about half-an hour at a time. The bromo-iodised waters of Woodhall Spa, with its balmy and invigorating air, have proved peculiarly suited to the treatment of this form of wakefulness. Entire freedom from the brain-work, which induced the symptoms in the first instance, must of course be enjoined in conjunction with one of these modes of treatment.

Impure or over-dry air will occasion sleeplessness from its irritating properties on the respiratory organs. In hot summer weather, Dr. Duckworth advises the sprinkling of water over the floor of the sleeping-apartment. This increases the moisture in the air, and possibly the quantity of ozone also, adding much to the comfort of the sleepers.

There are certain forms of wakefulness associated with more or less painful organic lesions, which are only to be overcome by the administration of anæsthetic or narcotic drugs. The artificial rest thus obtained differs from natural sleep in many ways, and specially in the far greater diminution of the functions of the sensory organs than does the other condition. Narcotics seem to act by directly interfering with the functional activity of the nervous system. How this cessation of function is brought about we cannot say. It is probable, however, knowing as we do how dependent is function on structure, that some actual change in the nerve stroma may temporarily occur as the results of their exhibition.

When the sleep of a patient is broken by severe pain, opium, or its alkaloid morphia, is of value, not only by directly relieving the pain, but also by assisting the production of sleep through its influence on the cerebral circulation. Opium, according to Handfield Jones, Stillé, and others, in moderate doses produces anæmia of the cerebral vessels, with a condition closely resembling sleep; in larger and in poisonous doses, there is, according to Hammond, a venous congestion of the brain-vessels due to impaired respiratory action, as it can be removed by having recourse to artificial respiration. Whilst this venous congestion lasts, profound stupor is present, and the animal is aroused with great difficulty, if at all. Great care must be taken, as we all know, in the administration of opium, that its use become not habitual to the patient. In the wakefulness due to severe neuralgia, it is frequently preferable to inject a small dose of morphia hypodermically near the branch of the nerve affected than to administer the drug by the mouth. When the want of sleep arises from the pains of muscular spasm (as for example that of gall-stone colic), or is accompanied by headache, flushing of the face, and other symptoms betokening a somewhat hyperæmic condition of the brain, it would seem that chloral hydrate was indicated. This drug has, I believe, been proved to possess considerable influence over the arterial tonus. In small doses it may possibly, as Anstie, Bouchut, and others state, increase the blood-pressure; in large doses, however, there is no doubt that both in man and in animals the arterial tension is greatly diminished. It is usually asserted that chloral diminishes the amount of blood circulating through the brain, and its hypnotic effects are ascribed to this cause. The mechanism of the cerebral circulation, as I have already noticed, would favour this idea. Any drug which relaxed the arterial tonus of the body, generally, will *a fortiori* diminish the supply of blood to the brain. For we have noticed that the dilatation of the blood-vessels of the brain is to some extent mechanically checked by the skull itself. Accordingly less blood would probably find its way into these vessels than into others where no such impediment existed. This will be specially the case when a general dilatation of the blood-vessels occurred, as is the case in chloral poisoning.

In the wakefulness arising from defective cardiac power, on the other hand, it frequently happens that digitalis, by strengthening the force of the heart's beats, drives the blood into the capillary system more vigorously, and relieves the congestion of the central organs and the anæmia of the extremities. By thus equalising the circulation we diminish the necessity that previously existed for an increased flow of blood through the cerebral vessels, and so we promote sleep.

By many therapeutists the bromides of potassium, sodium, ammonium, and camphor are supposed to possess hypnotic properties, but my own experience with these drugs is not confirmatory of such conclusions. These salts undoubtedly act as sedatives on the nervous system, and as such may occasionally induce sleep, but they cannot, I think, be ranked as true "sleep producers."

# SULPHUROUS ACID IN SMALL-POX.

BY J. INGLEBY MACKENZIE, M.B. CANTAB., RUGBY.

In the admirable paper on Sulphur and Sulphurous Acid in the May number of the *Practitioner* by Dr. Fergus of Marlborough College, he mentions sulphurous acid as a therapeutic agent, but does not advert largely to its internal use.

When in charge of the Small-pox Hospital in this place erected by the Urban Sanitary Authority some three years since, I was induced to try the effect of sulphurous acid in the treatment of that disease. Its success exceeded my anticipations. Its action was, I presume, antiseptic; it speedily reduced the temperature even in the most severe unvaccinated cases, and I never had any complaint from the patients as to its disagreeableness. It was given in doses of 20 minims freely diluted. My attention was called to the fact by reading a paper in "Braithwaite" giving cases in which sulphurous acid had been used in typhoid fever with success, and I argued that its antiseptic action would be equally great in small-pox. It will be interesting to learn if other observers ratify the conclusions I arrived at.

# ON DYSPEPSIA.[1]

### BY T. LAUDER BRUNTON, M.D., F.R.S.

To the healthy body the performance of its functions is a source of pleasure. The strong muscles rejoice in work, and exercise, to use up their superabundant energy, becomes almost a necessity; the brain works easily, ideas flow readily and clearly, and thought becomes a delight. Both bodily and mental work, however pleasant, entail waste which must be supplied, and the pleasures of exercise lead to the pleasures of the table, giving a zest to the plainest food and enhancing the flavour of the most delicate viands. When the day is over exercise and food give place to the pleasure of sleep, and almost as soon as the head is laid on the pillow, the dreamy delightful languor which succeeds healthy exercise passes into dreamless slumber, from which the sleeper awakes on the ensuing morn, refreshed and strengthened for the occupations of a new day. With such a condition as this we are probably all more or less familiar, and its full enjoyment during a walking tour, is, to my mind, one of the greatest charms of an autumn holiday. But unfortunately the conditions of life do not allow men to remain constantly under the favourable conditions in which we are placed during our vacation. Some have hard grinding bodily fatigue, continued hour after hour until the tired limbs can scarcely move, others have the still more exhausting mental drudgery, when despite the exhausted brain, the closing eyelids, and the aching head, the cramped fingers must drive the pen scratch, scratch, scratch, long past the midnight hour, into the cool grey of early morning. Excessive mental and bodily work thus become not a blessing but a curse, and although they generally bring some compensation by increasing the pleasures of sleep and rest, it is not always so. For although the wise man says sleep is sweet to the labouring man, whether he have eaten little or much, yet not unfrequently excessive mental labour drives sleep from the couch, and weary work is succeeded by more uneasy rest. Too much work thus weakens both the muscles and the brain, and causes the exercise of their functions to be performed imperfectly, and attended with suffering, instead of being, as in the healthy state, a source of pleasure. Now the same is true of the digestive organs. Within certain limits, the stomach, liver, and intestines, are very accommodating, and will digest much or little food, single dishes or a variety of meats with great facility, but whenever the tax upon their power becomes too great, they refuse to act, and in various unpleasant ways make known to their master that they are on strike, and either want less work or work of a different sort. As the stomach is that part of the digestive system into which food is first collected, and which therefore is generally the first to suffer from overwork, we will consider its part in the digestion of food first, and the indigestion due to the imperfect performance of its functions, without at present taking up those of the intestines or liver.

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[1] Read before the Abernethian Society at St. Bartholomew's Hospital.

We have now so much knowledge of an exact nature regarding the process of digestion, that we are apt to forget how recent is its date, and I therefore think it may not be unadvisable or uninteresting to devote a few minutes to describing the successive steps by which it has been acquired. The knowledge that food was broken up and partially dissolved in the stomach must have been early acquired, for the ancients as well as the moderns sometimes overtaxed their stomach with food or drink, and led that organ to reject the meal which had shortly before been consumed. In the paintings on Egyptian tombs,[1] we see ladies depicted who are suffering in this way ; and although they might not be themselves in such a condition as would lead them to examine very closely into the nature of the vomited matters, it could hardly escape the attention of the attendants or of the physicians who might be called in, and who, sometimes indeed, produced vomiting,[2] that these matters consisted of the broken

[1] Wilkinson's *Ancient Egyptians*, 1854, vol. i. p. 52.

[2] Wilkinson, *Op. cit.*, vol. ii. p. 350.

down and partially dissolved foods which had constituted the last meal. But how this solution was effected long remained a mystery. Some said that it was effected by the stomach grinding down the food in the same manner as the gizzard of a bird; but the ancients generally seem to have had the idea that it was effected by heat and moisture leading to a sort of putrefaction,[1] or by a secretion from the stomach with special solvent powers.[2]

The experiments of Réaumur in 1752, and of Spallanzani in 1783, showed that the food was not simply ground by the stomach, for substances inclosed in perforated metallic balls, and thus protected from any mechanical action of the gastric walls while exposed to the solvent action of the gastric juice, were found to be dissolved when the metal case was after a certain time withdrawn from the stomach by means of a string attached to it. The theory of putrefaction was also disposed of by Spallanzani,[3] who found that instead of this process going on in the stomach, it was immediately checked when substances in which it had begun were introduced into the organ.[4] But it is highly probable that the ancients meant something different from ordinary putrefaction, although they may have used the name to designate the process which takes place in the stomach during digestion, and Boerhaave propounded the theory that digestion was a process of fermentation. The questions, therefore, remained to be solved—Is digestion a simple solution in the gastric juice? or is it a change in the constitution of the food by oxidation or otherwise?[5]

In most experiments the gastric juice had been obtained in an impure state, and its admixture with saliva or mucus had rendered its reaction doubtful, but Carminati, in 1785, determined that it was acid when obtained pure during digestion, although nearly neutral during fasting in animals. Prout, in 1824, found that the acid was hydrochloric, and Tiedemann and Gmelin, in 1827, finally confirmed the results of Carminati.

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[1] Hippocrates, etc., Haller's *Physiol.* t. vi. p. 322.

[2] *Paulus Aegineta*, vol. i. p. 91.

[3] Spallanzani, *Expériences sur la Digestion*, Genève, 1783, p. 90.

[4] Spallanzani, *Op. cit.*, p. 310.

[5] Tiedemann and Gmelin, *Journ. de Physiol.* vii. 1827, p. 144.

They were inclined to attribute the solvent power of the gastric juice to the acid it contained, but their own experiments, as well as those of Johannes Müller, and still more of Dr. Beaumont, showed that acid of the same strength had nothing like the solvent power of the gastric juice, and that this secretion must therefore contain a peculiar solvent principle. This Eberle supposed to be the gastric mucus, but a few trials proved that this mucus alone would not dissolve the food, and that digestion took place only when it was combined with acid. The next step was taken by Schwann in 1836, and by Wasmann in 1840. They showed that it was not mucus in general but a special substance, pepsin, contained in the mucus of the stomach, which digested albuminous matters when combined with acid. The researches of Brücke have shown what the proper strength of the acid is, and that when it is either too strong or too weak digestion is hindered. The requisites for the rapid digestion of albuminous matters in the stomach, then, are an abundant supply of gastric juice and its proper composition as regards the proportion of acid and the amount of pepsin present in it. These requisites are supplied in the healthy stomach, which secretes a large quantity of active juice during digestion; but in disturbed and diseased conditions, either of the organ itself alone or of the whole system, they are more or less wanting, and digestion is imperfectly performed—we have, in fact, indigestion.

We owe our knowledge of the condition of the stomach in great measure to a fortunate accident which established a gastric fistula in a young man, and enabled observations to be made on him such as we can usually make only on animals, observations which were, however, imperfect, and have since been extended as well as confirmed by gastric fistulæ artificially established in dogs. A young Canadian, Alexis St. Martin, was wounded by a charge of duck-shot, which carried away the muscles on the left side of the thorax for several inches, along with the anterior half of the sixth rib, broke the fifth, and lacerated the left lung, stomach, and diaphragm. Notwithstanding the extent of his injuries, he finally recovered under the care of Dr. Beaumont; but the stomach became adherent to the abdominal wall, and preserved a permanent opening, which was usually stopped up by a valve of mucous membrane. This valve could be readily pushed back by the finger and the interior of the stomach distinctly seen. After St. Martin's recovery, Dr. Beaumont took him into his service and made numerous observations upon him, which, as I have already said, have been of the greatest value.

According to Dr. Beaumont, "the inner coat of the stomach, in its natural and healthy state, is of a light or pale pink colour, varying in its hues according to its full or empty state. It is of a soft or velvet-like appearance, and is constantly covered with a very thin transparent viscid mucus, lining the whole interior of the organ. Immediately beneath the mucous coat, and apparently incorporated with the villous membrane, appear small spheroidal or oval-shaped granular bodies, from which the mucous fluid appears to be secreted. On the application of aliment, the action of the vessels is increased, the colour heightened, and the vermicular motions are excited. The small gastric papillæ begin to discharge a clear transparent fluid, which continues rapidly to accumulate as aliment is received for digestion. This fluid is invariably distinctly acid. The mucus of the stomach is less fluid and more viscid or albuminous, and sometimes a little saltish, but does not possess the slightest character of acidity. On applying the tongue to the mucous coat of the stomach, in its empty unirritated state, no acid taste can be perceived. When food or other irritant has been applied to the villous membrane, and the gastric papillæ excited, the acid taste is immediately perceptible. It must be noted, however, that this acidity, though distinct, is not great, not such as to set the teeth on edge. The experiments of Bernard on dogs have given the same results as those just described, but have shown besides that while moderate stimulation of the stomach causes secretion, great irritation has an entirely opposite effect. For example, when the mucous membrane was gently stroked with a glass rod it became rosy red and secreted juice abundantly, but when violently rubbed the colour disappeared, it became pale, the secretion of gastric juice stopped, that of mucus seemed to be increased, and the animal seemed sick, and began to vomit. This experiment throws considerable light on the relation between the condition of the stomach and the appetite, and enables us in some degree to diagnose the condition of the stomach from the answer we get to our first question regarding the digestion of our patients—How is your appetite? Various opinions have been held regarding the cause of hunger, some attributing it to the friction of the sides of the empty stomach against each other, others supposing it to be due to the gastric juice acting on the mucous membrane in default of anything else to attack. The real cause seems to be twofold. 1st. A certain condition of the stomach, probably consisting in distension either of the lymphatics or capillaries of the mucous membrane, which is relieved when food is ingested and secretion begins. 2nd. A condition of the system which is not removed by the mere presence of food in the stomach but requires for its alleviation the absorption of nutritive material into the blood. This second condition may be observed in children suffering from tubercle of the mesenteric glands, where, owing to the imperfect absorption, a voracious hunger seems to consume the little sufferer, notwithstanding the quantities of food with which its stomach is constantly filled. The first cause of hunger or appetite, for they are merely gradations of the same condition, is the commonest, and the one with which we are at present concerned. Normally the stomach seems to prepare itself at regular intervals for the work it has to do, and as mealtime approaches the minute vessels probably become distended, and a feeling of appetite certainly appears. In some persons the time when this feeling comes on can be modified by mental impressions. If they know they are to dine at seven instead of at six the appetite appears a short while before the time fixed for the meal, but if they think they are to dine at six and do not get dinner until seven the expectant stomach begins to crave at six, and causes much discomfort during the ensuing hour while its wants are unsatisfied. In some conditions of the body we find that there is no appetite at first, but after a mouthful or two the desire to eat comes on, and the person rises from table after a full meal. Although I have not observed that Dr. Beaumont mentions this condition as occurring in St. Martin, yet we should be inclined to associate it with a mucous membrane paler and more flaccid than usual.[1] The lymphatics and capillaries, instead of being full before the meal, would only become so when the circulation in the stomach was increased by the introduction of food, and their distension, after the first few mouthfuls in this debilitated condition of the stomach would become equal to that in the healthy mucous membrane before any food had been taken at all.

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[1] Beaumont, *Physiology of Digestion*, Burlington, 1847, Expt. 45, 3d. Ser.

In other conditions again we find that the patient has, as he says, a good appetite and feels very hungry before meals, but after the first mouthful or two he is satisfied, and cannot eat any more. Here we in all probability have a condition of congestion greater than normal, so that instead of mere appetite positive hunger is felt before meals, but as soon as the first mouthfuls are taken, the increased vascularity which they induce raises the irritability of the stomach, and the stimulus of the food acts upon the mucous membrane in the same way as rough rubbing did in Bernard's experiment, destroying the appetite and even producing nausea. As a general rule, indeed, whenever the appetite becomes unusually good without any apparent cause, we may look out for a so-called bilious attack, for if the irritated condition of the gastric mucous membrane, which is at first felt as appetite, goes on increasing it soon proceeds to anorexia, nausea, and vomiting.

An example of this may be given from Dr. Beaumont's observations. On examining the stomach of St. Martin one day, four hours after breakfast, and an hour after the chyme resulting therefrom had passed through the pylorus, he found that "several red spots and patches abraded of the mucous coat, tender and irritable, appeared over the inner surface.[1] The tongue too had upon it a thin whitish fur. Yet his appetite was rather craving." Two days after this Dr. Beaumont introduced some food in a muslin bag, through the aperture, into the stomach, and on withdrawing it five hours afterwards, found that it came from near the pylorus, and was covered with a coat of mucus and yellow bile. "The contents of the stomach," he says, "have been unusually acrid since yesterday morning, and St. Martin complains of unusual smarting and irritation at the edges of the aperture; countenance sallow, tongue covered with a thin yellowish coat; and several deep red patches on the inner coat of the stomach; does not feel his usual appetite." Had St. Martin been left to himself and continued the diet of the previous days, consisting, as it appeared to do, of pork, steak, and fried sausages, we should probably have had him suffering from vomiting, and possibly sick headache, but Dr. Beaumont dropped into his stomach twelve grains of blue pill and five cathartic pills, which operated next morning with the effect, Dr. Beaumont says, of removing the symptoms and restoring healthy sensations and functions. Had no pills been given the condition of the stomach next day would probably have been such as Dr. Beaumont describes on another occasion, when the sick headache was actually present. He had been introducing various articles of food, amongst others fat pork tied to a string, into St. Martin's stomach, and two or three hours afterwards found the smell and taste of the fluid from the stomach to be slightly rancid, and St. Martin complained of considerable pain and uneasiness at the stomach, general debility, and lassitude. The next day the distress at the stomach and pain in the head continued, accompanied by costiveness, a depressed pulse, dry skin, coated tongue, and numerous white spots or pustules resembling coagulated lymph spread over the inner surface of the stomach. Dr. Beaumont accordingly dropped into the stomach half a dozen calomel pills,[1] containing four or five grains each, which in about three hours had a thorough cathartic effect, and removed all the foregoing symptoms, and the diseased appearance of the inner coat of the stomach.

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[1] Beaumont, *Physiology of Digestion*, Burlington, 1847, Expt. 17, p. 180, 3d. Ser.

When looking at a patient's tongue I have often wished that people wore windows in their bodies, and that one could see into their stomachs as readily as into their mouths. This wish is to some extent gratified by a perusal of Dr. Beaumont's observations, for in the three which I have just quoted he gives us a picture of three very common conditions.

In the first we have a craving appetite, tongue showing a thin whitish fur, and stomach with several red spots and abraded patches.

In the second we have loss of appetite, thin yellowish fur on the tongue, sallow, or, as we should often term it, bilious countenance, and stomach showing several deep red patches.

In the third the appetite is not mentioned, but we may conclude that there was none, as St. Martin had distress and uneasiness in the stomach, the tongue was coated, there was debility, lassitude, costiveness, depressed pulse, dry skin, and headache. The stomach showed numerous white spots or pustules.

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[1] Beaumont, *Physiology of Digestion*, Burlington, 1847, Expt. 1, p. 118, 2nd. Ser.

Curiously enough, however, the stomach sometimes showed signs of extensive disturbance without any apparent affection of the general health. This was especially noticeable after drinking spirits too freely. The mucous membrane then presented an erythematous appearance and livid spots, from the surface of which exuded small drops of grumous blood, numerous patches of aphthæ, a thick coating of mucus, and the gastric juice mixed with thick ropy mucus or muco-purulent matter slightly tinged with blood resembing the discharge from the bowels in dysentery. This condition of the stomach was accompanied by a thin, yellowish brown fur on the tongue, an uneasy sensation and tenderness at the pit of the stomach, and some vertigo with dimness and yellowness of vision on stooping down and rising again, and a sallow countenance, but otherwise he felt well and had a good appetite.[1] These four observations of Beaumont's describe the symptoms and appearances of the tongue which we usually meet with in cases of transient indigestion, and depict the condition of the stomach which he found associated with them.

We have now to consider the causes which induce these appearances, and we may shortly describe them as irritants of the stomach—

*a.* From excessive quantity.
*b.* From improper quality.
*c.* From mechanical chemical qualities.

A meal excessive in quantity will act as an irritant because a longer time will be required for the stomach to dissolve it, and during all this time the undissolved pieces of food are being rubbed up and down the mucous membrane and irritating it mechanically.

An improper quality of food will have a similar action. Suppose a lump of cocoa-nut to be eaten, the pieces when swallowed will be absolutely unacted on by the stomach, however long they remain there, and at the time when the organ ought to contain nothing but a soft pulpy chyme, which it would pass on to the duodenum, its walls are stimulated by the unaccustomed presence of the bits of kernel, hard and unyielding as at the moment they were introduced. Alcohol, by its chemical qualities acts as an irritant, producing, when its use is continued, very extensive alterations in the mucous membrane, and it is to be remembered that some substances which are not in themselves irritant may become so from changes which they undergo themselves, or occasion in other foods after their introduction into the stomach. Thus, fat pork is not an irritating substance—far from it; but it may become rancid in the stomach, and the fatty acids thus liberated may act as powerful irritants. Some cheese is indigestible on account of its insolubility and hardness, in the same way that cocoa-nut is, but other cheeses not liable to this objection may prove irritant by inducing the formation of butyric acid in the sugar taken into the stomach in the food or formed there by the action of the saliva and starch which have been swallowed together. Butyric acid appears to be the cause of that uncomfortable feeling known as heartburn, for Dr. Leared found that a pill of some sweet inert substance dipped in this acid and swallowed reproduced the sensation of heartburn exactly. A very acid condition of the contents of the stomach acts as an irritant and may cause vomiting, the vomited matters being so sour as to set the teeth on edge. What the exact cause of this sourness is I do not know, whether it be hydrochloric, lactic, butyric, or other acid, nor do I know exactly the cause of its production, but I well remember having a most violent sick-headache and an attack of vomiting after drinking some new beer, which I suppose continued in my stomach the fermentation which ought to have been complete before it was drunk, and which at the same time induced other ingredients of my dinner to join it in the process.

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[1] Beaumont, *Physiology of Digestion*, Burlington, 1847, p. 252.

It is a question not yet completely solved how far the mucus of the stomach acts as a ferment in producing acidity, and also whether abnormal substances formed in the intestine are absorbed from it by the vessels, secreted from them by the gastric glands, and poured out into the cavity of the stomach, just as we know that iodine is.

*Treatment of Temporary Indigestion.*—The conditions of the stomach hitherto mentioned, as well as the symptoms that accompany them, disappear when litttle food and that of a bland and unirritating nature is given for a short time, but recovery is greatly quickened, as we see from Dr. Beaumont's experiments, by the administration of a purgative, and now comes the query, Does this act reflexly upon the stomach through its nerves, or does it clear away from the intestine substances which are being absorbed from it, carried to the gastric walls, and excreted by them just as tartar emetic would be, and causing like it irritation of the mucous membrane? (*Vide* gastro-enteric circulation in diagram, and compare *Practitioner*, vol. xii. p. 408.)

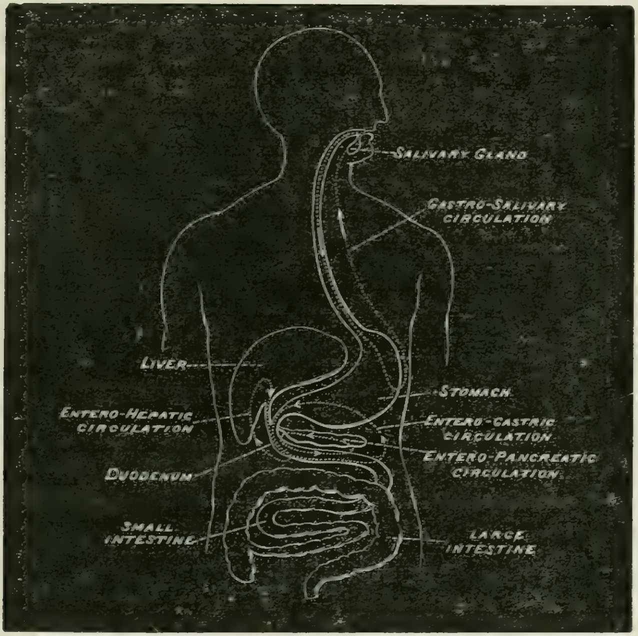
SALIVARY GLAND
GASTRO-SALIVARY CIRCULATION
LIVER
STOMACH
ENTERO-HEPATIC CIRCULATION
ENTERO-GASTRIC CIRCULATION
ENTERO-PANCREATIC CIRCULATION
DUODENUM
SMALL INTESTINE
LARGE INTESTINE

Diagram showing absorption from one part, and excretion from another part of the intestinal canal.

For my own part I am inclined to take the latter view, for on one occasion Dr. Beaumont finding that St. Martin's stomach was out of order, poured in an ounce of castor-oil. This did not purge, and the stomach continued as before. He then gave some calomel, which produced purgation, and the morbid appearances were quickly removed.

The question also arises, to what extent were the erythematous patches, and especially the lividity, due to obstruction to the circulation of the blood through the liver by biliary congestion? Dr. Beaumont says nothing about the existence of piles in St. Martin coincidently with this affection of the stomach. Had he done so it might have given us some useful hints regarding the pathology, obstruction to the portal circulation being likely to manifest itself in the veins of the rectum as well as those of the stomach.

When the irritating substances leave the stomach they may produce a similar effect upon the intestine and cause griping and diarrhœa.

Having said so much regarding slight acute indigestion, I must treat very shortly the subject of gastritis. Acute gastritis, such as is produced by irritant poisons, I will completely pass over, and only say a few words regarding sub-acute gastritis or gastric catarrh. If any one is obliged to inhale fine irritating dust for some time the mucous membrane of the bronchial tubes becomes inflamed, secretes a quantity of mucus or muco-purulent matter, and the inflammation is accompanied by more or less pain and rawness in the chest and attempts to expel the mucus by coughing. Not unfrequently the same condition comes on after exposure to a draught, although no irritating substance has been inhaled. The mucous membrane of the stomach and that of the lungs are not unlike in their reaction to irritation or cold. I have already mentioned that after St. Martin had been freely partaking of spirits for some days Dr. Beaumont found his stomach inflamed, bleeding, and partly filled with ropy mucus and muco-purulent material. From the ample experience which one gets at this hospital I think we may safely say that had St. Martin gone on drinking for some days more he would probably have got his stomach into such an irritable condition that he would have felt considerable pain and tenderness to pressure in the epigastrium, every morning when he rose he would have vomited some of the mucus which it had secreted over night, and he would have vomited the greater part of each meal shortly after he had taken it. The appearances presented in such a condition would probably have been the same as those actually observed by Dr. Beaumont, but somewhat intensified.

But a similar condition may occur in the stomach from exposure to cold or to a draught, just as in the case of the lungs, although no irritating substance has been swallowed.

How draughts act in producing this condition is a subject not unworthy of the Society's attention, but time would fail me were I to attempt to develop a theory of catching cold either in the stomach or lungs, in this paper.

*Treatment.*—The treatment which is very successful is to give about ten grains of bismuth with ten of magnesia, in a little mucilage three or four times a day before meals. If the vomiting is excessive it is well to combine a few drops of hydrocyanic acid and some bromide of potassium, and if the pain at the epigastrium be great a warm poultice or even a mustard plaster should be applied.

We must now pass on to the chronic forms of indigestion, and shall first take that of chronic gastric catarrh. The condition of the stomach here is just that presented by St. Martin after his alcoholic indulgence, but when it has continued long the structure of the stomach becomes more or less altered, the gastric glands undergoing fatty degeneration, and the connective tissue becoming increased and the mucous membrane firmer.

The symptoms are such as we should expect. There is either little appetite or a craving appetite, easily satisfied—sometimes instead there is a feeling of emptiness in the epigastrium or nausea, although there is little vomiting. From the irritable condition of the stomach there is often pain coming on shortly after food, or more or less constant, but increased by food. The secretion of gastric juice being imperfect, the food is slowly digested and undergoes decomposition, forming gases and acids, and thus giving rise to flatulence and heartburn. The constant discomfort and pain makes the patient irritable, and the imperfect digestion of the food as well as the diminished quantity taken on account of the pain caused by it lead to muscular weakness, and mental languor and depression.

The bowels are frequently constipated, or may be subject to alternate fits of constipation and diarrhœa. The pain complained of is partly due to the tender condition of the stomach, but it is also caused to a great extent by distension of the stomach with flatus.

This condition is very frequently seen in middle-aged or elderly women who come to the hospital complaining of "windy spasms." On inquiring more closely into their symptoms they tell you that they have "pain in the pit of the stomach, striking through between their blade-bones," and further questions will elicit most of the other symptoms already described. There are two remedies in the Hospital Pharmacopœia which work wonders in such cases: the Haustus Gentianæ C. Rheo., and the Haustus Calumbæ Alkalinus.[1]

Both of these draughts contain bicarbonate of soda and a vegetable bitter. When given before meals the alkali stimulates the secretion of gastric juice, while the bitter is supposed to lessen the secretion of mucus. The food thus becomes more rapidly digested, less acid and less gas are formed, and the spirit of chloroform, by acting as a carminative, enables such gas as is formed to be more readily expelled. When taken after meals this beneficial action of the alkali is lost, and it becomes injurious rather than beneficial, except in cases where excessive acidity is developed during digestion.

In regard to the pathology of acute attacks of indigestion, I mentioned that the livid spots observed by Dr. Beaumont might possibly be connected with obstruction through the liver. An additional argument in favour of this view is afforded by the fact that chronic catarrh, such as I have just described, may not only result from repeated or constant irritation of the

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[1] The formulæ for these are:—

Haustus Gentianæ cum Rheo.

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|---|---|
| Infusion of Rhubarb . . . . . . . . . . . . | ½ fl. ounce. |
| Tincture of Gentian . . . . . . . . . . . . | 30 minims. |
| Bicarbonate of Soda . . . . . . . . . . . . | 10 grains. |
| Spirit of Chloroform . . . . . . . . . . . . | 10 minims. |

Peppermint water to 1 fl. ounce.

Dissolve and mix.

Haustus Calumbæ Alkalinus.

| | |
|---|---|
| Bicarbonate of Soda . . . . . . . . . . . | 10 grains. |
| Tincture of Orange Peel . . . . . . . . . . | 30 minims. |

Infusion of Calumba to 1 fl. ounce.

Dissolve and mix.

stomach by alcohol, tea, spiced and indigestible foods, &c., or from cancer or ulceration of a part of the stomach, but also from interference with the portal circulation, as in disease of the liver.

Lastly, we will shortly consider atonic dyspepsia. This condition probably corresponds to that temporarily observed by Beaumont, where the mucous membrane was pale and flabby. The symptoms are here also such as we should expect, the appetite being almost absent, yet the patient is often able to eat a fair meal. The stimulus of the food, however, in a stomach below par does not cause a sufficient secretion of gastric juice, and possibly also the composition of the juice is not all it might be ; the digestion consequently goes on slowly, there is heaviness and weight at the epigastrium after meals, and the belly becomes humid from the generation of gas. Eructation gives relief, but not unfrequently is accompanied by heartburn, acids being formed as well as gas, and coming up together.

The symptoms, in fact, are those of imperfect digestion, already described under chronic gastric catarrh, with this difference that there is no marked pain and tenderness at the epigastrium, and the tongue, instead of being red or covered with fur, through which enlarged papillæ project, is rather pale, flabby, moist, and marked with the teeth at the edges.

This condition depends on weakness of the circulatory and nervous systems. For the secretion of gastric juice not only demands an action of secreting cells, but also a full supply of rich blood to supply the materials needed. Both the cells and the blood-vessels are under the direction of the nervous system, and unless it responds to the stimulus of food, the cells do not secrete, the blood-vessels do not dilate, the juice is not poured out, and digestion does not take place.

The treatment in such a condition is somewhat the same as in chronic catarrh, viz., alkalies and bitters ; but in addition we must attend to the general condition of the patient, and give iron to improve the condition of the blood, and the nutrition of both cells and nerves. Strychnia or nux vomica also is a most useful adjunct, as it increases the excitability of reflex centres, including those which preside over the vascularity of the stomach and the secretion of its cells, and thus renders them more ready to respond when the stimulus of food is applied to them. At least this is the theory I have formed to explain the undoubted advantage which we derive from its use in such cases.

In this paper I have not treated the subject of dyspepsia in the way in which it is usually found, either in text-books or lectures, but have preferred to fix upon a few points which may lead to an active discussion, and to a thorough knowledge of the connection between the symptoms we find in our patients and the conditions of the stomach which lead to them.

# A METHOD OF SWINGING INJURED LIMBS.

BY WALTER PYE, M.R.C.S.

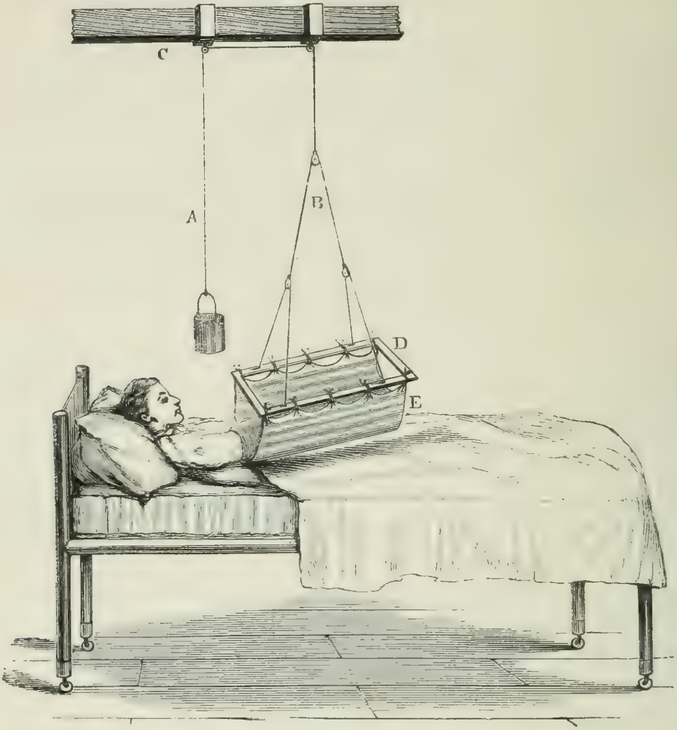
*House Surgeon, St. Bartholomew's Hospital.*

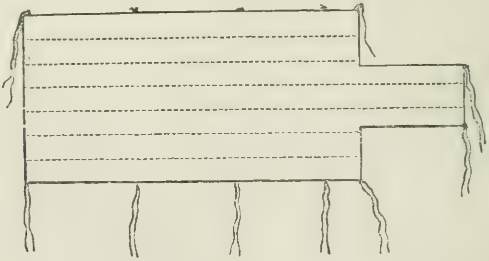
AN adaptation of the sawdust bags, introduced by Surgeon-Major Porter, has lately been used in Mr. Callender's wards, at Bartholomew's, and since it is simple, inexpensive, and easy of application, it may be worth recording in the *Practitioner.* It consists essentially in suspending the limb in a hammock made out of a muslin bag filled with sawdust, so as to be of an even thickness of about one inch.

This bag, fashioned roughly to the shape of the limb, may be applied either to the arm or leg, and has been found especially useful in lacerated wounds or in conditions involving large suppurating surfaces of the extremities. The arrangement that has been found most generally useful is one which may be figured thus. A B represents a system of weights and pulleys. A being a can of shot, in order that the weight may be readily altered. C is an overhead bar which supports the whole apparatus. D is a light wooden frame, wide enough to prevent the sides of the bag E pressing too closely the limb placed in it.

The bag is fastened to the frame by tapes sewn at pretty close intervals to its edges, and in this way the support can be moulded to the requirements of the limb. In the case of an injured arm the hammock may be simply oblong, but if it be required for a leg it had better be shaped thus, so that when it is swung in position the foot is supported by the piece A.

A very exact balancing of the limb is not found to be necessary; if it is roughly correct the patient will be able to shift himself about and to turn over in his sleep without disturbing the swinging limb. In order to ensure success, there are one or two details which may be briefly stated, but which yet are practically important. 1. The bag should be made of linen, it should be about an inch thick when filled, and must be quilted longitudinally, so as to resemble a cricketing pad. 2. The linen





before being used should be first boiled and then ironed. 3. The sawdust must be freshly sawn. That from the red pine is best, but other sorts will do. 4. The raw surface of the wound should not be in contact with the bag, but should be protected by a layer of simple dressing *e.g.* oiled lint. 5. As a rule the bag must be changed every fourth or fifth day.

The advantages claimed for this method are that since the discharges are soaked up and deodorized by the sawdust, or rather by the turpentine contained therein, frequent changes of dressing are not required, while the support afforded by the bag is found in practice to be exceedingly comfortable.

# Reviews.

*The Care and Cure of the Insane.* By J. MORTIMER GRANVILLE, M.D., F.S.S. London: Hardwicke and Bogue, 1877.

DR. MORTIMER GRANVILLE has succeeded in bringing together a large mass of information, opinion, and speculation on the subject of Asylum Management. If he has not said much that is new he has at least shown that he can make a judicious selection from the opinions of others, and can support them opportunely and effectively. The original intention of the papers which form the body of his two volumes renders it almost necessary that the style of the book should be somewhat journalistic, and the impression which the reading of it conveys is that a collection of leading articles on asylums and insanity has found its way into octavo binding. When Dr. Granville agrees with Dr. Brushfield, with Conolly, Sir William Ellis, Jacobi, Pinel, the Lunacy Commissioners, &c., we generally agree with Dr. Granville. We support his advocacy of small asylums, medical autocracy, moral treatment, nutritive diet, full provision for the very earliest possible treatment of acute cases, and the other common-sense principles which have long been held by almost every medical superintendent in this country. But when he undertakes, as he seldom does, to speak on any subject which has not been fully ventilated before, and in which some expression of independent judgment is required, we are somewhat inclined to disagree with him. More especially must we take exception to the manner in which he pronounces his verdict on the therapeutics of insanity. Throughout Dr. Granville's work there are constant remarks which aim at bringing into disrepute the employment of drugs in lunacy treatment, but only once, as far as we are aware, does he give any beyond a sentimental reason for the convictions which he expresses. He says :—"Sleep or tranquillity cannot be obtained in a case of lunacy by drugs without inducing a degree of hyperæmia, passive or active, in the cerebro-spinal centres which can scarcely fail to prove injurious." Perhaps the two drugs most commonly used in lunatic asylums are chloral hydrate and bromide of potassium; and we have yet to learn that their action on the circulation is not totally opposed to the production of hyperæmia. What the writer "exposes" and "asks physicians practising in asylums everywhere to abandon is the practice of physicking their patients to 'spare strength' or 'subdue excitement.'" Now why should this be called a "spurious" form of treatment? Why should it be such a therapeutical crime to spare strength or subdue excitement? If it is good to stop the convulsions of teething or whooping-cough with chloral, why should the convulsions of the epileptic not also be arrested? And if his convulsions may be arrested with chloral, why not also the excitement which is co-related with them and owes its origin to the same cause? We are glad that Dr. Granville anticipated that he would be contradicted when he expressed his conviction that "while a few physicians are administering *quietness* in the shape of chloral hydrate, croton chloral, bromide of potassium, hyoscyamine, and similar remedies, largely, the majority are abandoning the practice as for curative purposes useless, if not injurious." We do contradict the statement, and on the other hand express our belief that in no branch of therapeutics has greater advantage been taken of the demonstrations of practical physiology than in that which has to do with the treatment of brain disorder. If at the present time specialists in insanity are abandoning as worse than useless medicines which have a special action on the brain, we may soon expect to hear of physicians who treat Bright's disease discarding diuretics, and liver-doctors swearing enmity against laxatives. If the medical treatment of the insane is to be conducted without the use of medicines, professional superintendents must be prepared to hand over their keys to farm bailiffs and their dignity to matrons. However, Dr. Granville's observations as to the extent to which medicines are employed may be quite as fallacious as his notions regarding their mode of action.

*Hints on Insanity and signing Certificates.* By JOHN MILLAR, L.R.C.P. Second Edition. Henry Renshaw: London, 1877.

*Notes on Asylums for the Insane in America.* By J. C. BUCKNILL, M.D., F.R.S. J. & A. Churchill. London, 1876.

*Disease of the Mind.* By CHARLES F. FOLSOM, M.D. Boston: A. Williams & Co., 1877. London: Trübner & Co.

THE second edition of Dr. Millar's manual will be very warmly welcomed by general practitioners and junior members of the specialty of lunacy. Modest not only in size but in style, it can be cordially recommended as a most trustworthy means of obtaining such a practical knowledge of Insanity as will be highly useful to all classes of medical men.

Dr. Bucknill's *Notes*, when they are, as they ought to be, regarded more as cursory observations than deliberate criticisms of American asylums, are exceedingly useful, and likely to lead to good results in the way of diminishing the amount of restraint which is still practised in that country.

Dr. Folsom's treatise, though some people will object to the title of it, contains a very useful sketch of the general history of the treatment of insanity, and deals with the present state of asylum management in America and elsewhere. It is gratifying to find in it such undoubted evidence that the influence of Dr. Bucknill and the comparison of English and Scotch Asylums with American, are leading to a steady diminution in the amount of restraint employed in the latter country.

*On Idiocy and Imbecility.* By WILLIAM W. IRELAND, M.D. London: Churchill, 1877.

DR. IRELAND set himself no easy task when he undertook to write a scientific treatise on Idiocy and Imbecility. At the very beginning of his work he has to make the best of an obstacle in the shape of a classification. "Coming," he says, "to the study of Idiocy after having gained some experience in medicine, I have from the beginning viewed it from the standpoint of pathology," and at once he submits the following as his classification:—(1) Genetous Idiocy, (2) Microcephalic, (3) Eclampsic, (4) Epileptic, (5) Hydrocephalic, (6) Paralytic, (7) Cretinism, (8) Traumatic, (9) Inflammatory Idiocy, and (10) Idiocy by Deprivation. Of course Dr. Ireland is not altogether to blame for the weak points of his classification. Things cannot be permanently classified till their points of *essential* likeness and unlikeness have been determined, and as this has not been done with regard to the pathology of the various kinds of Idiocy and Imbecility, and has been only incompletely done with regard to the symptoms dependent upon certain gross pathological conditions, nothing but a simple projection of a classification of Idiocy is as yet admissible. Dr. Ireland's *tu quoque* method of argument is not fair in this respect. Dr. Johnson said that one had a right to criticise the workmanship of a deal table, though it were a much better table than he might be able to make himself, and one may be fit to judge upon general principles that a method of classification is bad without having sufficient knowledge of detail to construct a better. For our own part, we can only express a natural wish that when an improvement is made upon Dr. Ireland's classification it will be found possible to divide Idiocy into groups which do not almost completely overlap each other.

While referring to the weak points of a book which on the whole is deserving of the highest praise, it may be suggested that Dr. Ireland will be able to take a much more philosophical view of many of the details which he mentions as features of Idiocy and Imbecility when he has arrived at a wider knowledge of the more recent aspects of physiological and clinical investigation regarding the functions of the brain, as propounded in the writings of Hughlings-Jackson and Ferrier, and in the philosophical system of Herbert Spencer. We are surprised, also, that in a work emanating from so versatile a pen as that of Dr. Ireland, and dated from a Scottish institution for the treatment of the weak-minded, so little should have been said about the "naturals," who are still numerous in Scotland, and who, having been rendered classical by Sir Walter Scott, have had many of their witty sayings recorded by the genial Dean Ramsay. It would be interesting to know how much changes in domestic life in Scotland, and the greater tendency to organised charitable relief, have modified the race of the half-witted population whose existence is, or used to be, a feature of Scotch towns and villages. A chapter on this subject might very profitably be substituted for Dr. Ireland's chapter on Wolf-boys.

We know of no book in the literature of this country which enters so fully and temperately into every subject connected with the pathology, etiology, and special treatment of Idiocy and Imbecility. We can cordially recommend the work to all who desire to possess such knowledge of the subject as has up to the present been arrived at. Readers will find it to be a pleasant and interesting book on a repulsive and uninteresting subject. We fully agree with Dr. Ireland when he comments with disapproval on the necessity for admitting harmless idiots into county and other asylums. The practice is fatal to the hope of educational progress on the part of the idiot, and is quite unfair to the acutely insane, whose prospects of recovery are to no small extent lessened by their being associated with imbeciles—caricatures of nature—whose presence must tend to give objective reality to the subjective obliquity which shapes itself into delusions and hallucinations.

# Clinic of the Month.

**Chlorate of Potash in Saturated Solution as a Specific Remedy against Diphtheria.**—Dr. A. Seeligmüller, of Halle (Prussia), thus sums up his observations of the action of chlorate of potash against diphtheria:—

I. The chlorate of potash administered in the form of a saturated solution (5 per cent.) has a specific effect on diphtheria.

II. It must be given in a solution of one part in twenty of distilled water, without adding any syrup or any other substance to improve the taste.

III. This solution is to be ordered to infants under three years in doses of half a spoonful; to elder ones in doses of a whole spoonful every two hours; and, if the malady is very serious, every hour at first, *day and night without interruption.*

IV. This internal medication alone will suffice in all cases.

V. The saturated solution of chlorate of potash exercises (*a*) a topical action, and (*b*) a general one on the diphtheritic process—(*a*) a topical one, by acting as a mild escharotic, and also by aiding in the detachment of the diphtheritic pseudo-membranes from their basement-membranes, (*b*) as a general one by supplying the oxygen withdrawn from the blood-corpuscles by bacteria, and destroying these organisms.

VI. Caution is required lest the saturated solution act dangerously on heart or digestion. When such symptoms occur, the administration of the salt must be suspended. (*Medical Times and Gazette*, August, 1877.)

**Cure of Aneurism by Esmarch's Bandage.**—Dr. Pearce Gould gives, in the *Lancet*, an account of popliteal aneurism cured by application of Esmarch's bandage. The treatment has now been employed on several occasions by various surgeons, but with by no means constant success; and the importance of the preparation by Mr. Wagstaffe, shown at the last meeting of the Pathological Society, which corresponds in all its details with Dr. Reid's, is that it throws light on the mode in which the cure is wrought, and also on the causes of failure in other cases. The artery is seen to be occluded with organised fibrous tissue for a distance of some two or three inches, and the sac of the aneurism has shrunk to a small size, and surrounds old, dry, unorganised blood-clot. There can be no doubt that at the time of the application of the bandage a clot formed in the aneurism, and also in the part of the artery with which it communicated. The latter clot was surrounded by healthy vessel-wall, from which capillaries from the vasa vasorum shot out into it, and organisation took place; but the clot in the aneurism was surrounded by an unhealthy sac, or perhaps by a layer of laminated fibrin, and organisation under these circumstances was an impossibility. Hence the cure was obtained by occluding the artery, not by occluding the aneurism, which, however, ceased to be an aneurism so soon as the communication with the channel of the artery was closed. If this be the correct explanation, it follows that for the success of this treatment two things are necessary—first, the extension of the clot from the aneurism into the artery; secondly, a fairly healthy state of the vessel-wall to permit of the organisation of this thrombus. The extension of the clot into the artery will depend upon the size of the mouth of the aneurism; and we arrive at the somewhat striking conclusion, that aneurisms with large mouths, which are unfavourable for the ordinary methods of cure, are especially favourable for that by Esmarch's bandage. But to counterbalance this, the larger the mouth of the aneurism the greater the probability of the artery being extensively diseased, and, therefore, the less the prospect of organisation of the clot. This latter factor is probably the less important of the two, for there is sure to be some part of the artery-wall healthy, and organisation will take place from any such spots. The fear that this rapid coagulation would lead to inflammation or even suppuration of the sac was a common opinion where such coagulation was produced by various direct methods of treatment—manipulation, injection, passage of foreign bodies into the sac—which it was evident were highly likely to lead to such a result. But it is difficult to understand how a simple blood-clot can do it. (*Lancet*, Nov. 10th, 1877.)

**The Treatment of Hydrophobia.**—Several communications have been forwarded to the *Lancet* in regard to hydrophobia and its treatment. Thus Mr. Hayward, of Liverpool, writes, that in experiments with venomous serpents constitutional symptoms sometimes show themselves within a quarter of a minute. However quickly and however thoroughly, therefore, cauterisation or excision is performed no person ought to be considered to be put beyond danger by the operation alone. Something more is needed, for he has some of the venom within him, and it will perform its work as a ferment, less or more in proportion to its quantity and virulence and the resisting power of the individual. Now the natural resisting power of the individual may of itself be sufficient to overcome the influence of the venom, as in some cases it evidently is, and as it is in many cases of snake-bite, and so the ordinary symptoms of hydrophobia will not show themselves; but, if not, they will display themselves in due time, shorter or longer, in proportion to the quantity and virulence and resisting power. The natural resisting power may be diminished by fear and other depressing and exhausting causes; but it may also be increased by various means, mental and physical, and even medicinal, such as encouragement, hope, forgetfulness, exercise, Turkish baths, tonics, &c., and even by specific medicines, as indicated in successful treatment by curara. But all these means should have fair play, should have a fair start—an equal start with the venom—should be begun immediately after the introduction of the venom, and should be carried on perseveringly until past the period of incubation of the venom; especially should any specific medicine thought of—curara, for instance—have a fair chance by being introduced immediately, and its influence should be kept up perseveringly by small doses during the whole period of incubation.

Mr. Mears draws attention to a few facts as regards treatment observed in two cases admitted recently into the London Hospital under Dr. Fenwick. Both patients were kept quiet and apart, and were fed by enemata of beef-tea and milk at frequent intervals. In the first case, acetate of morphia, given subcutaneously to as much as three grains in six hours, failed altogether in effect, in no way quieting the delirium. Chloroform could not be administered as it choked the patient at once, even when very carefully given, rendering artificial respiration necessary. Such was also its action in another case. Ice to the spine was likewise useless. There were no special symptoms suggesting tracheotomy or local treatment of the scar or nerves corresponding. In the other man the marked congestion was unrelieved by bleeding up to six ounces, but lessened considerably under aconite, given hypodermically in three doses of one-sixtieth of a grain at two hours' interval. The pulse at the same time softened, and the patient felt relieved. Chloral hydrate given by enema, twenty or thirty grains occasionally, so as to keep the patient under its influence, had a very marked effect, diminishing much the delirium, and stopping the respiratory spasms, so as to allow the man to swallow milk by teaspoonfuls without much effort. At the same time it gave him quiet and refreshing sleep. Unfortunately, however, the administration was intermitted, and could not be resumed later in consequence of the patient's delirium. As a result of the observation of its action, there seems some probability that chloral has an influence possibly great over the disease, at all events in much modifying its outward manifestations. Such a probability is considerably strengthened by the facts noticed in a case admitted a short time since under Dr. Sansom, in which, with almost complete suppression of the prominent symptoms, life was prolonged to the tenth day (a longer period than any of 200 recorded cases taken at random), whilst death was certainly accelerated by, and probably in great part due to, other causes than the disease itself. Apart from any direct action, might not chloral, he asks, repress the disease till it has run its course, and thus lead to a good result? Or might it not in some way act directly as it has done in some cases of traumatic tetanus lately cured by it? Whether curative or not, it certainly appears to relieve all the pressing and painful symptoms, and thus acting is likely to be a most valuable remedy.

Another correspondent suggests the use of salicin, or one of its preparations, as a prophylactic remedy in hydrophobia. Immediately after the person has been bitten by a rabid animal he would advise salicin to be administered in such doses as would produce free perspiration, and that this should be continued for a reasonable period, with the view of eliminating from the circulation the *morbus viri* before it has established its habitat in the system. In acute rheumatism, and in rheumatic fever, the rapid way in which this remedy either removes from the constitution by skin elimination, or neutralises and renders inert, the morbific matter that has caused the disorder, has impressed him with the belief that this powerful and apparently safe medicine might possibly exert some salutary influence in preventing the development of a disease that has so long baffled the best efforts of the profession when the specific action of the virus has been established.

Mr. Jack calls attention to the great mistake made in cauterising the bite of a dog with nitrate of silver, which only destroys the surface and forms a skin over the wound, never reaching the poison which has been absorbed, in the slightest degree. Excision, actual cautery, or caustics, such as nitric acid (strongest), are alone of the least use. When hydrophobia is so wide-spread it is a pity, he observes, that any one should be misled into a fancied security by such an application as nitrate of silver.

J. S. G. suggests atropine and belladonna, the former used hypodermically, and the latter externally, particularly the extract smeared on the throat. (*Lancet*, Nov. 10th, 1877.)

**The Action of Morphia.**—As the result of a long series of experiments on cold- and warm-blooded animals, Dr. Ludwig

Witkowski comes to the following conclusions with regard to the action of morphia:—1. In a degree proportionate to the dose, which varies in different animals, morphia causes paralysis of the cerebral centres for sensation and voluntary motion. 2. The paralysis of these centres is not preceded by irritation or increase of excitability, but the various symptoms which have been thus explained are due to disturbances in the equilibrium of the separate functions of the brain. 3. The respiratory centre is the last to become paralysed, and paralysis of this centre is the only or the main cause of death. 4. The centres for the inhibitory fibres of the pneumogastric, for the vaso-motor nerves, and those regulating the contraction of the pupil, are not directly influenced by morphia as regards either irritation or paralysis. 5. Morphia increases the reflex excitability of the spinal cord. 6. Morphia does not affect the peripheral nerves whether motor or sensory, or the organs in which they terminate. (*Medical Examiner*, Oct. 18, 1877.)

**Cerebral Thermometry.**—At the recent meeting of the Havre Congress, M. Broca communicated the results of his experiments made for the purpose of determining cerebral temperatures under various conditions. M. Broca employs a collection of small thermometers arranged symmetrically, so as to form what he denominates "the thermometric crown." The experiments were performed on twelve of his dressers and pupils. The following were some of the principal results obtained. The temperature was one-tenth of a degree (Cent.) higher on the left temple than on the right; and this, M. Broca remarks, is in conformity with the greater activity of the left side of the brain. On measuring the temperatures while the brain was actively employed by reading, &c., it was found that a difference existed of 34-100ths deg. C. in favour of the right side. The clinical relations are not so easily established. Several years ago M. Broca found an excess of two-a-half degrees for the diseased side in a case of softening of the brain. Recently he attempted to apply the thermometer for the purpose of diagnosis in a case of cerebral embolism, followed by hemiplegia. The temperature had fallen on the side where, from the symptoms, arterial obstruction was presumed to exist. M. Broca has not yet made any experiments in cases of cerebral hæmorrhage, but he has every reason to hope that cerebral thermometry will contribute essentially to the differential diagnosis of the various forms of apoplexy. (*Medical Examiner*, Oct. 18, 1877.)

**Treatment of Rheumatic Fever with Salicylate of Soda.**—Dr. Julius Pollock, in a clinical lecture on rheumatism, contrasts the action of various remedies that have been largely used in the treatment of rheumatism, and then proceeds to say that he believes the salicylate of soda will be used in all cases where the action of salicylic acid is desired. It is very soluble, which the acid is not, and it is far less liable to give rise to unpleasant symptoms. He gives the preference, most decidedly, to the soda salt, as at present advised, though it is quite possible, indeed likely, that combinations of salicylic acid with potash, ammonia, and iron, may turn out to be very valuable. In any case of articular rheumatism, whether acute, sub-acute, or chronic, the salicylate of soda should be tried in doses of ten, fifteen, or twenty grains, every two, three, or four hours according to the severity of the symptoms. It is best to give it alone, or in combination with a little spirits of chloroform or syrup of orange. As a rule, the good effects of the drug are apparent after eight or ten doses; the temperature falls rapidly to normal, or even a little below, the pain and swelling of the joints disappear, and the patient is practically convalescent in two or three days; but it is better to keep up the action of the medicine for a week or so, as relapses are liable to occur if it be discontinued too soon. In some intensely rheumatic subjects it will be necessary to give it again and again before the disease is subdued, and these cases have been used as an argument against its efficacy. Some persons will not admit the value of mercury and iodide of potassium in the treatment of syphilis, and others question the protective power of vaccination against small-pox. All new remedies have to encounter the opposition of ignorance and prejudice, but the evidence in favour of salicylate of soda in the treatment of articular rheumatism is becoming so overwhelming that its great value must be regarded as thoroughly established. No doubt the drug, every now and then, produces disagreeable symptoms—sickness, deafness, tinnitus aurium, and sometimes a peculiar cerebral disturbance; but these quickly vanish on a discontinuance of the medicine, which may usually be again given in a short time without any such result. In the earlier trials, when the salicylate was not quite pure, these objectionable symptoms were much more common than now. (*Lancet*, Oct. 20th, 1877.)

**Oakum as an Antiseptic Dressing.**—At a meeting of the Ulster Medical Society, Dr. Robert Esler stated that the value of oakum as an antiseptic dressing was first brought under his notice by the late Dr. John M'Crea, who had for some time been using it extensively. Oakum is simply tarred rope reduced to its original state of flax or hemp with the addition of the tar, and during the American war carded oakum was employed extensively in the dressing of wounds, and subsequently to that time the surgeons to the Children's Hospital in Great Ormond Street introduced it into this country. Dr. Esler's observations on its value as an antiseptic agent were first made in the Union Infirmary, and subsequently, but more minutely, in the Ulster Hospital for Children, and they have been in the following class of cases:—amputations, abscesses, ulcers, cutaneous erysipelas, phlegmonous erysipelas, and burns. The number of cases in the first class in which he has used this dressing have been in two major and several minor amputations. Either of two methods may be adopted. In the first the dressing is made as simple as possible. A single strip of lint soaked in carbolic or spirit lotion applied next the wound, with a roll or two of bandage to hold it in position, and the stump then surrounded with oakum and another bandage, if necessary; or the oakum may be applied next the wound, and this method is less objectionable than would at first sight appear, and the flax might be much preferable to cotton in contact with a granulating surface. The advantage of this dressing is, that for stumps it is simple of application, it makes a soft pad on which to rest, and, what is of the greatest importance in the wards of an hospital, it effectually keeps down any offensive odour; and, more, its effect seems to be to destroy the putridity of the discharge, while the pleasant tarry smell is strongly suggestive of the sea, of ships, and of fresh air. In most of the cases in which Dr. Esler has seen it applied, healing has taken place by the first intention, and this is, no doubt, partly accounted for by the freedom with which the serum is discharged from the wound, and by the prevention of ingress to any substance which would favour decomposition. In abscesses, Dr. Esler has opened some dozens of these where the only subsequent treatment was a pad of oakum bandaged over the part; and in every case where there was not diseased bone underneath, the result was more satisfactory than he has ever seen from any other treatment. He instances one case, that of a labourer, aged about fifty:—The abscess was gluteal, and had grown almost to the size of his head; the skin and muscles were enormously distended. He expected the healing to be so tedious that he thought of introducing a drainage tube or plug, but having faith in oakum he applied a good large pad over the part after evacuating the contents, and directed the man to lie on it, so that any discharge might drain into the oakum. The shrunken skin and relaxed muscles in a few days seemed to fit into their places, the opening healed without a blush of inflammation, and in a week the man was in his usual health. In some cases it is desirable to poultice for some time before using the knife, and all know how troublesome it is to continue this for any length with linseed meal, and many surgeons have a great dislike to these oily appliances. In oakum we have the material for an antiseptic poultice in abscesses or inflammatory attacks, by simply dipping it in hot water and covering it with waterproof tissue.

In cutaneous erysipelas as well as in the deeper and more serious stage of the same disease, viz. the cellulo-cutaneous, where abscesses have formed or sloughing is taking place, Dr. Esler is of opinion that oakum is simply invaluable.

The conclusions at which he arrived regarding oakum as a dressing are that :—it is cheap; it is clean; it is easily applied; it is equal to any and in many respects superior to most other dressings of the same class; and that it is antiseptic. Tar is very complex in its composition; it is an altered resin and an empyreumatic oil, in which the following substances are found: creasote, paraffin, picamar, and eupion; and as a therapeutic agent is principally used in chronic skin diseases. (*The Dublin Journal of Medical Science*, Oct. 1, 1877.)

**Doses of Bromide of Potassium in Epilepsy.**—Dr. Fletcher Beach directs attention to the fact that in the treatment of epilepsy in children large doses of the bromide should be given in order that successful results may be obtained. He usually orders fifteen grains three times daily for all the epileptic patients in the Clapton Asylum under his charge, and this dose is continued not only during the epileptic seizure, but for weeks or months afterwards. In some cases fifteen grains have been given every two hours for a short time with great benefit, and during the *status epilepticus* he has on a few occasions, when the breathing has been much affected, injected into the bowel one or two drachms with good result. (*British Med. Journal*, Oct. 13, 1877.)

**Dental Caries.**—Mr. Alexander Stewart refers much of the destruction of the teeth by caries to acidity, and states, as proofs of the solution of the calcareous salts of the teeth by the acids to which they are exposed in the mouth, that some teeth placed in a cider cask disappeared entirely; that the enamel of teeth kept for two years in a solution of lactic acid (1—100), and of citric acid (1—1,000 of water) became friable and easily reduced to powder; that fluid containing ordinary forms was found to produce effects precisely similar in appearance to caries of teeth in the mouth, acetic and other acids being formed by decomposition; that teeth placed in water containing a small quantity of saliva with fragments of bread became softened in twenty days, and lastly, that with solutions of sugar the naked eye appearances of dental caries were exactly imitated, the solutions acquiring a distinctly acid reaction. The chief sources of the acids that destroy the teeth are—the fermentation of food left on and between them after meals; acid drinks; some articles of food, as fruit, cooked and uncooked, salads, and pickles; mineral acid mixtures, acid mucus from the gums, acid fumes in some manufacturing processes. The means for preventing caries recommended by Mr. Stewart, and which he wishes to see in general use, are—rinsing the mouth thoroughly with water after the last meal of the day to remove all particles of food; rinsing immediately afterwards with an alkaline solution to neutralise any acid or its effects; moderate brushing in the morning to remove any mucus secreted at night. He does not hesitate to say, that if these simple means were commonly employed, toothache would be as rare as it is now common. (*Idem*, Oct. 20, 1877.)

**Acne Rosacea Treated by Ointment of Chrysophanic Acid.**—Dr. Balmanno Squire gives a case of a lady, aged forty-five, in good health, except that her face presented the blotchy patches of discoloration characteristic of some varieties of acne rosacea, together with the large pimples representing the tuberculous variety of the disease, the individual pimples being in some instances as large as split-peas, and occupying very abundantly the forehead, cheeks, and chin. She was treated with chrysophanic acid ointment as an external application, and with glycerate of nitrate of bismuth as an internal remedy. She commenced treatment in the middle of January. On the 27th of February she presented herself quite free from any trace of the former eruption. Dr. Squire attributes the alteration she experienced purely to the action of the chrysophanic acid ointment. The ointment consisted at first of twenty grains of chrysophanic acid dissolved in one ounce of lard at the temperature of an oil-bath. For the last ten days of the treatment, however, the strength of the ointment was raised to forty grains of chrysophanic acid to the ounce of lard. The ointment in both cases was regularly three times a day rubbed well in all over the face, avoiding only the eyelids and lips. From the beginning to the end the patient never experienced any smarting from this energetic treatment. However, occasionally the face became a little puffy, as if slightly swollen. Throughout this treatment the face became more or less stained by the action of the ointment; but the stain was not very deep. It was of course only transient. (*Medical Times and Gazette*, June 23, 1877.)

# Extracts from British and Foreign Journals.

**Treatment of Diphtheria.**—Dr. Chapman recommends the free use of alcohol in this disease as being almost a specific, either alone or with quinine. The remedies should be given regularly and in full doses, the quinine being administered in sufficient quantity to cause ringing in the ears. The alcohol should be given in diminished doses for two or more weeks after the disappearance of the disease and its sequelæ. (*Buffalo Med. and Surg. Journ.* Oct. 1877.)

**How to Disguise the Taste of Quinine.**—Dr. Curtis finds that glycerrhizine, the sweet principle of liquorice, rendered soluble by ammonia, has an extraordinary power of disguising the bitter taste of quinine. A grain of it will cover the taste of a grain of quinine, and two grains of it will dissolve in a drachm of syrup. He usually employes a mixture containing fifteen grains of glycerrhizine and fifteen of sulphate of quinine in an ounce of simple syrup. This gives nearly two grains of quinine to the drachm, and in it the taste of the quinine is almost perfectly disguised. (*Chicago Med. Journ. and Examiner*, Oct. p. 428.)

**Ergot in Hæmorrhoids.**—Dr. Lansing has used a suppository containing four grains of ergotin, at first morning and night, and afterwards at night only, in four cases of piles with excellent results. The first application of the ergotin produced pain for half an hour or more, but after the use of three or four suppositories no unpleasant effect attended their use. He was led to employ them by the idea that the ergotin would cause contraction of the muscular walls of the dilated hæmorrhoidal veins, and thus effect a cure. (*Philadelphia Med. Times*, Oct. 13.)

**Retarded Dilatation of the Os Uteri in Labour.**—In two papers read before the Philadelphia County Medical Society, and reprinted and enlarged from the Medical and Surgical Reporter, Dr. Albert H. Smith considers that there are two forms of rigidity of the os uteri, active or vital, and passive. In the treatment of the former the author prefers opium, while anæsthetics, chloral, venesection, tartar emetic, and incision, are briefly considered. In the second form of rigidity, the hot water douche—a temperature of 105° to 110°—is first advised; then judicious traction upon the anterior lip with the finger; the india-rubber dilators, the author's preference being for those of Barnes, and after dilatation has progressed far enough to make them available, the obstetric forceps, which are an admirable aid to further dilatation. (*American Practitioner*, 1877.)

**Bromide of Arsenic in the Treatment of Epilepsy.**—Dr. Th. Clemens states that he has employed this remedy for twenty years in the treatment of epileptic attacks, with astonishing success. He administers one or two drops of the solution in a glass of water once or twice a day, and has no hesitation in continuing the use of the remedy without interruption for months or even for years, feeling satisfied that no symptoms of the toxic influence of the drug will be experienced. All the cases of epilepsy thus treated underwent marked improvement, though complete recovery only occurred in two instances. In incurable cases complicated with malformation of the head and with hereditary predisposition, the number of daily attacks was greatly diminished under the use of the medicine, in some instances being reduced from twenty-four to two or four in the course of the day, and this occurred with much greater certainty than under the action of any other remedy he had tried. Dr. Clemens considers an abundant diet of meat, and residence in pure air both by day and by night, to constitute important adjuncts in the cure. An increase in the dose, such as is required when bromide of potassium is prescribed, is not requisite in the case of bromide of arsenic. Like arsenic itself, the bromide of arsenic, when taken for a considerable period, causes augmentation of the total weight. The solution Dr. Clemens employs is made by taking 3·75 grammes of arsenious acid and carbonate of potash, which are dissolved in half-a-pint of distilled water gradually raised to the boiling-point. The volume of the solution is raised by the addition of water to a total of 360 grammes. To this solution 7·5 grammes of pure bromine are added. After the mixture has stood for some considerable time it becomes clear and colourless. (*Deutsche Zeitschrift für praktische Medicin*, Sept. 22, 1877.)

**Carbolated Camphor and its Use as a Surgical Dressing.**—Dr. Soulez of Romorantin recommends this substance very highly. He prepares it by mixing one gramme of carbolic acid (solution of nine grammes acid to one gramme alcohol) with two-and-a-half grammes of powdered camphor. The product is an oleaginous pale-yellow liquid with a feeble odour of camphor and no odour of carbolic acid at all. It does not mix with water or glycerine, but does mix with olive and almond oils. The infusion of saponaria (100 grammes of the leaves of soapwort to 1,000 grammes of water) emulsifies it, as does also the alcoholic tincture of *Quillaria saponaria* (alcohol at 90°, one litre; Panama bark, 250 grammes). When mixed with an equal part of the carbolated camphor, this tincture produces a mother emulsion, which, when diluted with water, is used to prepare the antiseptic wadding. In dressing a wound Dr. Soulez covers it first with a square of wadding which is impregnated with a mixture of carbolated camphor and olive-oil. This must be large enough to extend two-and-a-half to three inches beyond the wound. This is then covered by six other layers of wadding impregnated with the emulsion above-mentioned. Each layer should be one-inch wider than the one below it. A thin envelope of caoutchouc is then applied to prevent evaporation, and over this a layer of dry wadding, and the whole is then secured by a bandage. The author claims that this dressing is very easy of application; all the materials can be prepared beforehand, and kept in well-covered jars. Before applying it the wound should always be washed with the emulsion of carbolated camphor. The dressing possesses all the advantages and none of the inconveniences of Lister's method. When applied to a stump, for instance, it keeps it enveloped in a warm atmosphere saturated with vapour of water, which lessens the exciting effects of the oxygen of the air, and is protected by the numerous layers of soft wadding, which keep out all infecting germs. Dr. Soulez renews the dressing usually every six days, but sometimes leaves it on for ten days. So far he has never known the carbolated camphor to cause the least irritation of the skin or the wound. When the caoutchouc is removed all the layers of wadding are found to be as moist as when first applied. He claims to have obtained the following advantages from the use of his dressing:—1. Lessening of the reaction after major operations. 2. Cessation or diminution of the pain. 3. Diminution of the suppuration. (*La Tribune Médicale*, Dec. 24, 1876, and *Med. Record*, March, 1877.)

**The Treatment of Simple Carbuncle.**—Dr. Clever describes in the *St. Petersburgh medicinische Wochenschrift* the following case:—A stout woman of sixty years of age, who had for some years suffered from obstruction of the hepatic and portal system, was attacked with a violent rigor, followed by a carbuncle on the right gluteal region. A painful tumour formed over the right tuber ischii surrounded by brawny tissue, the whole swelling being seven or eight inches in diameter. In the course of a day or two the apex of the tumour softened, and clear reddish fluid oozed from the surface. The prognosis was considered to be unfavourable. Several deep incisions were made and poultices applied. Dr. Clever, finding the patient got worse, determined to inject carbolic acid subcutaneously. The solution employed contained two per cent., and was injected by means of a Pravaz' syringe. Every morning four syringefuls were injected at various points of the periphery, and one into the middle of the carbuncle. In the course of four days, during which twenty injections were made, the infiltration entirely disappeared. The pain was abolished in two days and the fever greatly diminished. From the opening which had been made a tolerably abundant purulent brownish-red fluid exuded, which continued for some days after the last injection, but all pain on pressure had disappeared and the patient two days after last injection was able to sit down comfortably on a chair. No injurious subsequent effects followed. (*Allegmeine Wiener medicinische Zeitung*, July 24th, 1877.)

**Substitute for Cod-liver Oil.**—G. Markonet obtained and experimented with large quantities of oil derived from the *Petromyzon fluviatilis* (lamprey). He finds that it contains more iodine than that of the liver of the cod. The oil is cheap, of thin fluid consistence, is not unpleasant to the palate, and is borne well by the stomach. The lamprey is obtainable in large numbers at the mouths of the rivers opening into the Caspian Sea. (*Deutsch. Zeits. f. prakt. Med.*, October 6, 1877.)

**The Treatment of Tetanus.**—Dr. Henri de Renzi, who has had the opportunity of treating an unusual number of cases of tetanus, has employed the most various therapeutic agents as opium in large doses, subcutaneous injection of morphia, atropin, curara, prolonged baths of hot water, large doses of hydrate of chloral, the application of electricity, but without successful result. The only instance in which he was successful was one in which the patient was kept in absolute rest. In one of the fatal cases the author satisfied himself that the number and intensity of the tetanic spasms underwent considerable increase as soon as daylight was allowed to penetrate into the previously dark room. In frogs in which he had produced tetanus by means of strychnia the tetanic spasms were much more intense when the animals were exposed to light than in those that were kept in the dark. The attacks were also more frequent and violent in animals made to move about than in those kept at rest. On these grounds M. Renzi adopts the following plan of treatment. He keeps the patient in a perfectly dark and thickly carpeted chamber, the door of which is only gently opened every four hours for the purpose of supplying food. The external auditory meatuses of the patient are closed with wax, and the patient recommended to keep at perfect rest. The food given consists of beef-tea, eggs, and wine. The medicines consist only of belladonna-powder and ergot. By the employment of these means Renzi has succeeded in saving the lives of three out of four tetanic patients. (*Gazette Médicale de Paris*, 1877, No. 32.)

**Treatment of Tetanus.**—Dr. Ferrini reports a case of traumatic tetanus cured by chloral and jaborandi. The anæsthetic action of the chloral was useful in retarding the paroxysms and securing restorative sleep to the patient. The jaborandi caused abundant diaphoresis, and thus lowered the temperature, causing a sudden and great improvement in the condition of the patient. The temperature fell in two days from 39° C. to 37° C. (102°–98°·6 Fahr.). The treatment lasted twenty days. (*New York Med. Jour.*, vol. xxv., No. 3.)

**Treatment of Deep-seated Atheromatous Cysts of the Neck.**—Professor Esmarch, at the Fourth Congress of the German Surgical Society of Berlin, brought forward his experience of about a dozen cases of deep-seated atheromatous cysts treated in the following manner:—The contents of the cyst were first evacuated by means of a fine trocar, and the cavity was repeatedly washed out with a one per cent. solution of carbolic acid with the object of removing as far as possible the friable masses of epidermal cells. The injection was continued until it escaped colourless; from ten to twenty grammes (two to four drachms) of Lugol's iodine solution was now injected into the empty cyst, and by gentle pressure was brought into contact with all the internal surface. After a few minutes the solution was allowed to escape. After the operation the cyst was found to become again tense, like a hydrocele after injection, with fluid as a result of inflammatory reaction. But in the course of from six to eight weeks the cyst in general became completely shrunk. If, however, this failed to occur, Esmarch repeated the operation in the same manner, and a cure was the invariable result. Professor Esmarch points out that the removal of such cysts by operation is by no means devoid of danger, especially on account of the close connection that so often exists between the wall of the cyst and the sheath of the jugular vein, and further that even if they are successfully removed, an ugly cicatrix is always left. (*Med. chir. Rundschau*, H. 1, 1877.)

**Therapeutical Uses of the Balsam of Peru.**—Dr. Wiss gives the results of his treatment with the balsam of Peru of all kinds of injuries, cuts, lacerations, and wounds, and states that it has been most successful, the wounds, whether simple or suppurating, healing up with great rapidity. At the moment when the balsam is applied to the wound there is a momentary sensation of burning which however is immediately followed by a sensation of relief, even in the case of the most severe injuries. No inflammation follows, and there is no tendency to suppuration. No case has fallen under his observation in which there has been any disposition to septicæmia even when the surrounding conditions have been most unfavourable. Lacerated wounds healed up by first intention. He gives amongst other cases one of a young man whose head was broken by some blunt instrument. On examination the aponeurosis of the occipito-frontalis was exposed and the skin reflected in three flaps. As soon as the bleeding had stopped and the wound had been cleaned, he poured some balsam of Peru over it, and applied a simple pledget of charpie with a bandage. The next day he was astonished to find that the wound had almost completely healed without suppuration. In two or three days more cicatrization was complete. Its power in preventing suppuration suggested its use to Marcus for chronic bronchial catarrh, when it had been otherwise shown that the lungs were healthy. Dr. Wiss bearing these observations in mind, tried it in similar cases, and expresses himself as being well satisfied with the result. The mode in which he administered it was in the state of emulsion, four parts of the balsam being beaten up with 120 of yolk of egg, and one teaspoonful of the emulsion being given every two hours. In one bad case in which he had tried copaiba without success, the employment of the above emulsion effected an immediate marked improvement in the quality of the expectoration, and ultimately cured the patent. (*Med. chir. Rundschau,* No 1. 1877.)

**Animal Broth as an Aliment in Disease, with a Series of Analyses.**— An important paper with this heading appears from the pen of Dr. J. Horton. He remarks that it is probable no one article of diet has been more relied upon in the past, in cases of great extremity, than animal broth. Within the last few years the demand for it has been so great that large manufactories have been established in various places. One located on the Uruguay river, South America, used, in the production of this article, during eight months of the year 1873, the flesh of 122,075 cattle of the value £410,000. The extract of meat derived from this enormous quantity of flesh was 570,000 pounds. When one contemplates this immense production, and remembers that it is only one of several manufactories in the world, and that the product of them all combined does not contain a single pound of what is strictly termed food, we can only wonder that this great waste of time, money, and materials still continues.

Were we called upon to assign to animal broths their proper position among the agents we give to sustain a patient where the danger of dissolution lay in asthenia, we would say: first, alcohol; secondly, organic salts; lastly, tea and coffee—for no doubt the physiological action of animal broths is due to the organic alkaloids and acids which they contain (lactic acid, inosinic acid, creatine, creatinine, inosite, &c.), and as their effects on the system are very similar to those of the active principles of tea and coffee (theine and caffeine), from which they differ mainly in strength, it must be concluded that animal broths, beef-tea, and extract of meat are more of a "vital restorative than a nutritious food." Professor Liebig classes beef-tea and coffee under the head of "nervous food," as they are of themselves incapable of supporting nutrition and maintaining life, whilst they have temporarily sustaining properties greater than tea and coffee, yet less than alcohol.

The saline-mineral constituents of beef-tea are the acid phosphate of potassa, phosphates of magnesia, lime and soda, chloride of potassium, and a small quantity of chloride of sodium. They do not participate in the chemical changes going on in the body, but serve by their presence to enable those changes to go on which are necessary for the process of nutrition.

From the present state of our knowledge upon this subject the physician should not direct beef-tea to be given in quantities greatly above what is necessary for nutrition and for exciting the gastric glands to action, just as in health we take a small amount of soup at the beginning of a meal to excite secretion and stimulate digestion.

Dr. Horton gives the result of a series of carefully-conducted experiments in the manufacture of tea from beef and other kinds of flesh for the purpose of showing the exact amount obtained in each of the various methods pursued, which were the same that would be adopted in any ordinarily well-regulated household. The following are some of the most important and suggestive:—

No. I.

| | |
|---|---|
| Beef, finely divided | 7,000 grains. |
| Water | Oj. |

Macerated eight hours, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine, &c. | 4,228 grains. |
| Water | 2,398 ,, |
| Extractive matter | 374 ,, |

If macerated for sixteen hours, no material difference is observed in the quantity extracted.

No. VII.

| | |
|---|---|
| Beef, finely divided | 7,000 grains. |
| Water | Oj. |

Macerated eight hours, and expressed cold.

| | |
|---|---|
| Fibrine, &c. | 4,890 grains. |
| Water | 1,610 ,, |
| Extractive matter | 500 ,, |

### [No. VIII.

| | |
|---|---|
| Beef, finely divided | 7,000 grains. |
| Soda, bicarbonate of | ʒj. |
| Water | Oj. |

Macerated eight hours, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine, &c. | 5,208 grains. |
| Water | 1,352 ,, |
| Extractive matter | 440 ,, |

### No. IX.

| | |
|---|---|
| Beef, finely divided | 7,000 grains |
| Pepsine | ʒj. |
| Water | Oj. |

Macerated eight hours, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine, &c. | 4,368 grains. |
| Water | 1,872 ,, |
| Extractive matter | 760 ,, |

### No. X.

| | |
|---|---|
| Beef, finely divided | 7,000 grains. |
| Hydrochloric acid, C. P. | ʒj. |
| Water | Oj. |

Macerated eight hours, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine, &c. | 4,848 grains. |
| Water | 1,337 ,, |
| Extractive matter | 815 ,, |

### No. XIII.

| | |
|---|---|
| Beef, finely divided | 7,000 grains. |
| Pepsine | ʒj. |
| Hydrochloric acid | ā ā ʒj. |
| Water | Oj. |

Shaken thirty minutes, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine, &c. | 4,321 grains. |
| Water | 1,799 ,, |
| Extractive matter | 880 ,, |

### No. XVIII.

| | |
|---|---|
| Veal, finely divided | 7,000 grains. |
| Water | Oj. |

Macerated eight hours, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine, &c. | 5,061 grains. |
| Water | 2,729 ,, |
| Extractive matter | 210 ,, |

### No. XX.

| | |
|---|---|
| Mutton, finely divided | 7,000 grains. |
| Water | Oj. |

Macerated eight hours, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine | 4,049 grains. |
| Water | 2,651 ,, |
| Extractive matter | 300 ,, |

### No. XXI.

| | |
|---|---|
| Chicken, finely divided | 7,000 grains. |
| Water | Oj. |

Macerated eight hours, and boiled fifteen minutes.

| | |
|---|---|
| Fibrine, &c. | 4,260 grains. |
| Water | 2,260 ,, |
| Extractive matter | 480 ,, |

No. XXII.

| | |
|---|---|
| Chicken, finely divided | 7,000 grains. |
| Water | Oj. |

Macerated eight hours, and expressed without cooking.

| | |
|---|---|
| Fibrine, &c. | 4,940 grains. |
| Water | 1,100 ,, |
| Extractive matter | 960 ,, |

It will be seen by reference to experiment No. 7 that the material, when expressed without cooking, contained a much greater amount of solid matter, of which a large proportion might be classed as food. In this uncooked condition it would be very difficult to induce a patient to take it. If chicken is used instead of beef it may be slowly added to boiling farina made with milk, briskly stirring all the while to prevent coagulation. In the preparation of this compound it is necessary to leave all seasoning out of the tea, and to make calculations for the additional amount of fluid added to the farina, so that it will be of the proper consistence when cool enough to be taken. Where chicken was used Dr. Horton has seen the tea from one pound of lean meat added to a bowl of farina, without discolouring or changing its taste sufficiently to be discovered by the patient.

A careful reader of the above experiments will notice that half a pint of water to one pound of meat furnishes as much extractive matter as any greater amount; that long boiling does not increase the strength; that from four to six hours' maceration is desirable where time will allow; that being shaken thirty minutes equals eight hours' maceration, which is quite an object where time is valuable.

Where we wish to get some food from the meat pepsine and hydrochloric acid are important additions, or, where both are not at hand, either may be advantageously used alone.

The insoluble fibrinous matter may be carefully dried and powdered in a mortar, and then mixed with the tea; in this way we get the nutritious matter of the meat in a finely divided state, and it will be easily digested. Where the tea is prepared daily, it is more convenient to use one day's meat for the next day's tea; by this means it has time to dry, and is more easily pulverised.

When hydrochloric acid is used alone in the preparation of beef-tea, and the tea is too acid for the patient, it may be neutralised by the addition of sodic carbonate, thus converting it into sodium chloride. (*New York Med. Journal*, Feb., 1877.)

**On Feeding by the Rectum.**—Dr. G. Kauffmann observes that since the discovery of Kussmaul's stomach-pump, and the application of Leube's meat-pancreas clysters, the therapeutics of gastric and intestinal affections has entered upon a new stage. Not that the employment of nutrient injections was not an ancient method of treatment, and many persons suffering from stenosis of the digestive tract have been treated by means of enemata of broth, eggs, and wine, but scarcely in any instance has such a method, where there was true occlusion of the alimentary canal, been productive of permanent benefit or life being long preserved. Nutrient enemata were a last refuge, and being quite fluid often either excited active peristalsis or were soon discharged. Of very great importance in the inquiry, as to how life might be prolonged by injections, was the determination of the functions of the glands connected with the intestinal canal (made out it will be remembered chiefly by vivisections) and especially of the pancreas. The results of inquiry showed that the pancreatic fluid not only converted albuminous compounds into peptones, but decomposed fats, rendering them readily absorbable, and effected the change of starch into sugar. Other experiments had shown that the mucous membrane of the large intestine was only an absorbing and not an assimilating surface, and consequently an agent was required which would effect the digestion of the various constituents of the food if introduced into the rectum. This agent was clearly the substance of the pancreas shown by still other experiments to be as active as the secretion of the gland. Dr. Kauffmann has given the meat-pancreas enemata in nine cases, and with the most brilliant results. In eight of these the stenosis was due to cancer of the alimentary canal, whilst in the ninth, that of a woman, chronic gastric ulcer was diagnosed and the vomiting was so constant that her powers began to fail, but life was maintained for many months by the use of the clysters alone. In seven of the above eight cases the cancer was seated in the œsophagus and in one case in the pylorus. One of these cases was kept alive nine months, two clysters being given per diem, at noon and at 6 P.M., the former generally after a cleansing enema had been administered. The noon enema was not discharged but absorbed. Each day a quantity of 300 grammes (about 1 lb. av.) of finely minced beef, carefully freed from fat and connective tissue were introduced with 100 grammes of pancreas. This patient felt quite well, took his walk and pipe daily in the garden, and died from hæmatemesis. (*Deutsche Zeitschrift für praktische Medicin,* Nov. 3, 1877.)

**Atropine and Daturin.**—Dr. Pöhl states that Planta has demonstrated the identity of these two alkaloids, since not only is their composition and reaction the same, but their physiological action is in both instances alike. And although Schroff, Lemaitre, and others have demonstrated some not unimportant differences in different specimens, these differences would appear from the experiments of von Hager to the greater freedom of

English atropine from a second alkaloid termed belladonnin by Hübschmann. Nevertheless Erhardt has demonstrated certain differences between the crystalline forms of atropine and daturin; Pöhl adds that whilst daturin turns the plane of polarization of light to the left, atropine is optically inactive, moreover whilst atropine as salts are precipitated by platinum chloride those of daturin are not. The opposite is obtained in the case of picric acid. Pöhl therefore entertains some doubt of the identity. (*St. Petersburg med. Zeitschrift*, No. 20.)

**Lesions of Intra-muscular Nerves in a Case of Lead-poisoning.**—A painter, thirty-two years of age, who had frequently suffered from lead-colic came under the care of M. Mayor, and died from interstitial nephritis after he had suffered for three weeks before his death from typical lead-paralysis of the extensors of the forearm, the muscles moving the thumb and the extensor carpi ulnaris remaining alone intact. The intra-muscular nerves of the extensor communis and of the extensor pollicis longus were treated with osmic acid and then with carmine, and it was found that whilst the nerves distributed to the extensor pollicis were healthy, those of the extensor communis exhibited myelin, coagulation, atrophy of the axis cylinder, proliferation of nuclei, and in some fibres complete disappearance of the myelin, so that Schwann's sheath was empty; lastly, a few fibres appeared to be unaffected. The muscular fibres of the extensor communis were partly in a state of granular fatty degeneration, and in part reduced in volume with great proliferation of the nuclei of the sarcolemma. The muscular fibres of the extensor longus pollicis was sound. The changes thus corresponded completely to those occurring in peripheral paralysis, but which does not by any means prove the peripheral origin of the disease. The spinal cord and anterior roots were not examined. (*Gazette Médicale de Paris*, 1877, No. 19.)

**The Treatment of Hypopyon.**—This condition, which not unfrequently occurs after slight accidents to the eye, and consists of the accumulation of pus in the anterior chamber, is both dangerous and troublesome. In a paper describing the affection, and the treatment he has found most effective, Dr. Fano states that it is customary to perform paracentesis of the cornea to allow of the escape of the matter, but that on the following day the pus will usually be found to have re-collected. He therefore recommends a more active plan of treatment, which consists in the application of a very fine point of nitrate of silver to the edges of the wound made by the needle in performing paracentesis. The excess of the nitrate should be immediately washed away with a little salt and water. This proceeding effectually prevents the union of the edges, and establishes, so to speak, a drain, which lasts for some days. Where the iris shows a tendency to adhere to the edges of the wound it may be pushed back, and the opening restored by means of an Anel's probe. (*Gazette Médicale de Salzbourg*, No. 6, 1877.)

**Treatment of Hydrophobia by Oxygen.**—A girl, seven years of age, was bitten by a rabid dog. The wound, which involved the subcutaneous cellular tissue, was at once cauterized with nitrate of silver and healed completely in seven days. The child had suffered three months previously from diphtheria, which had left a paralytic aphonia. When the wound had healed the child became very excitable. Seventeen days later dyspnœa suddenly manifested itself. The inspirations were free, but expiration was difficult and interrupted. Deglutition was almost impossible; the pulse was rapid and the fingers contracted. Neither urine nor fæces were passed for forty-eight hours. The child inhaled three cubic feet of oxygen, which relieved the symptoms in two hours and a half. The next day a more severe attack occurred, with spasm of the muscles of the back and limbs, spasmodic respiration, and complete insensibility. These symptoms were again removed in three-quarters of an hour by the inhalation of oxygen. The slight dyspnœa which remained was treated in the same manner with oxygen for ten days, and the child made a complete recovery, with the aid of the monobromate of camphor, which was continued for two weeks. (*Wratschebuija Wedomosty*, No. 36, and *N. Y. Med. Record*, July, 1877.)

**Action of Continuous Currents in the Treatment of Hemianæsthesia.**—M. Magnan has endeavoured to restore the diminished or abolished sensibility of the skin and of the organs of special sense, which occur in hysterical and in alcoholic patients, suffering from unilateral motor and sensory paralysis, by the application of the constant current. He applies the positive pole to the neck and the negative pole which terminates in a metallic brush to the anæsthetic parts. The number of elements applied was often very considerable, varying in different persons from 7 to 30. The best results were obtained in those suffering from chronic alcoholism. (*Gazette Médicale*, No. 20, 1877.)

# Notes and Queries.

## NOTES AND CORRESPONDENCE.

Hypophosphite of Lime Biscuits.—These biscuits, prepared by Mr. Van Abbott at the suggestion of W. Adams, F.R.C.S., are intended for children suffering from a tendency to rickets, consumption, or any of the diseases for which hypophosphite of lime is beneficial. Each biscuit contains five grains of hypophosphite. They are exceedingly palatable, and, although specially intended for children, may be used by adults suffering from the nervous depression in which the hypophosphites are often so serviceable.

Printed Pills.—We have received from Messrs. Burgoyne, Burbidges, Cyriax, and Farries, specimens of pills each of which is thoroughly coated and has its name legibly stamped on the outside. The coating of each sort of pill has a distinctive colour, so that they can be readily separated should they get accidentally mixed. The advantages claimed for them by the manufacturers, are that they are perfectly round and always uniform in size; they are perfectly soluble, even in cold water, in the space of a few minutes; they never crack; their coating is purely vegetable, and of an absolutely innocuous description; they are tasteless, odourless, and will keep for any length of time in any climate: they are as low in price as the employment of the very finest drugs will possibly allow, and not materially higher than any other coated pills; they obviate all possibility of mistake or confusion, from the fact of every pill being of a distinctive colour, and bearing its name and dose (or any other inscription required); they can be made to order of any size.

Liebreich's Syrup of Chloral.—In the June number of the *Practitioner,* Professor Liebreich mentioned some of the disadvantages and dangers which attend the use of impure chloral.

The British Pharmacopœia, gives several tests for ascertaining the purity of a specimen of the drug, but these tests cannot be applied to the syrup, which is one of the most convenient forms of administering it. Therefore unless the prescriber has a much more intimate acquaintance with chemical analysis than most practitioners possess, he is completely dependent on the chemist who supplies him and cannot himself test the purity of the drug he receives. Under these circumstances, a syrup of which the purity is guaranteed by Professor Liebreich himself, and which can therefore be employed with confidence, must be most acceptable, and we are glad to find that Messrs. Corbyn, Stacey, and Co., are now able to supply such a preparation.

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# Department of Public Health.

## ON SOME CONDITIONS INFLUENCING THE EPIDEMIC PREVALENCE OF CERTAIN DISEASES IN INDIA.[1]

BY SURGEON-GENERAL JOHN MURRAY, M.D.,

*President of the Epidemiological Society.*

GENTLEMEN,—

I am much gratified by the honour you have done me in appointing me successor to the many distinguished members of our profession who have filled this chair. After the earlier celebrated epidemiologists who presided over our Society, you elected representatives of the Military and Naval Services, and then Mr. Netten Radcliffe, my immediate predecessor, who has so efficiently represented the Civil Service. The Indian Medical Service is now called on for one of its members, and I am proud of being chosen.

I fear my long absence in India[2] may make me less conversant than I could wish with the duties which devolve upon me, but I trust the interests of the Society may not suffer under my care.

During the past year there has been little activity amongst epidemic diseases.

The *plague* revived in Mesopotamia and Persia in the cold season of 1876, and subsided at the commencement of the hot season in June. It has followed the same course this year, 1877. It has also been very severe this year in Gurhwal and Kumaon—mountainous districts on the southern slopes of the Himalayas. *Yellow fever* has been active at several points on the eastern coast of America, and in the West Indian Islands; but I have no definite details of these outbreaks. *Cholera* has been quiescent, except in India, where in the province of Bengal there were 190,590 fatal cases. This was attributed partly to the effect of a cyclone, which flooded with salt water, a large part of Eastern Bengal. An interesting case, recalling the early events of the epidemic of 1865, occurred in the Red Sea. A French transport steamer—*Corrège*—sailed from Saigon on the 19th July, 1877, with upwards of 700 troops on board. On the following day a virulent case of cholera occurred; and from that time to the 16th of August there were sixty cases and thirty-two deaths. The ship reached Suez on the 24th of August; at that date the last of the convalescents from cholera had left the hospital. There were 130 sick landed in quarantine at Tor, but there was no report of further cases of cholera.

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[1] The inaugural address delivered at the opening of the twenty-seventh session of the Society, 14th November, 1877.

[2] [Dr. Murray began his career in India in 1833, and he retired in 1871, after thirty-eight years' continuous service in that country, with the exception of six months. At the time of his retirement Dr. Murray was at the head of the Indian Medical Service, and he received the thanks of the Governor-General in Council.—ED. PRACT.]

India offers peculiar advantages to the student of epidemiology from the regularity of its seasons, and the varieties of its climate, which form very powerful agents in controlling all epidemic diseases. Though these features are apt to be overlooked in the variable and unsettled climates of Europe, I trust I may be pardoned for dwelling in my address chiefly on the diseases most prevalent there. During my long residence of thirty-eight years in that country, my attention was specially devoted to this branch of medical science. The Indian government is most liberal in forwarding all investigations on this subject, and the organisation of the Bengal Medical Service, in its military and civil branches, both being directed from one central authority, enables all its energies to be concentrated on any particular subject, and an inquiry can thus be more efficiently conducted than by independent members of the profession in Europe.

All epidemics have much in common of a practical nature, independent of their specific differences; and the experience I gained in India may be useful to this society and to other students of this interesting but most difficult branch of science.

The field of observation in India is very extensive, the civil population being nearly two hundred millions, from which the statistical reports, though still imperfect, are, for epidemiological purposes, more complete than those of any country in the world. The reports of the European and native troops and of native prisoners of the strength of 270,921 are very full and reliable. The monthly records of the European troops are complete from the beginning of this century. Those of the civil population only commenced in Madras in 1864, and were extended to Bengal in 1869, and since then are being collected all over India. They are still imperfect but are progressively improving.

*Plague* has appeared in the plains of India only once during my residence there—at Palee, in Rajpootana, in the year 1836. It was supposed to have been imported from the Persian Gulf in some merchandise. It appeared to spread across the Dooab in 1837, but loosing its bubonic character, it assumed more that of yellow fever, but resumed the bubonic form on reaching the Himalayan mountains in 1838, where it has lingered ever since in the dirty villages of Gurhwal and Kumaon. It is called the "Maha Murree," or great death, and recent accounts show that it has this year been very fatal in some of these villages.

*Small-pox* is never absent from India; but at intervals of four or five years it is more prevalent and fatal. There are occasional attacks at all seasons; but the disease does not spread extensively in the North-Western Provinces, the Punjaub, and Central India, except during certain months, coinciding with the hot dry season. The influence of season is less distinctly traceable in Madras, where there are two monsoons, and the climate is not so sharply defined as dry, moist, and cold, and is also more influenced by the sea.

I have seen several severe epidemics of *typhoid fever* since 1858, appearing in the cold season, subsiding as the hot season advanced, and disappearing when the rains commenced.

*Cholera* has existed in India from the date of our earliest records. There was a virulent attack at Hurdwar in 1781. It was also seen in the Madras Presidency in 1784, and among the native troops in Bengal in 1790-91; but it has been more prominently noticed since 1817, when a very violent attack broke out at Jessore, in Bengal, and extended over the whole of India, *viâ* Burmah to China and the East, and to the West through Scinde, Persia, and Turkey to the Mediterranean; and by Astracan and the Caspian Sea to Russia in 1830; and through Europe to America in 1832.

Since that time there have been several severe epidemics in Europe and America, which were general extensions of those in India, progressing steadily during the same seasons and by the same routes. The only instance in which I have observed the disease to enter India from the north was in an attack which I traced from Cabool in 1843, where it was called the "Kala Murree," or Black Death.

The want of a precise definition of the meaning of the terms employed in conducting investigations on the nature of cholera is a serious obstacle to arriving at any satisfactory result; for instance, the words "contagious" and "infectious." After the outbreak of cholera in 1817 an inquiry was instituted, and the secretaries of the medical boards in Calcutta, Madras, and Bombay called on all medical officers to report their experience of the disease. After receiving these reports, Dr. Jameson, in Bengal, gave an abstract of the prevailing views in his presidency, and a few extracts illustrating his own opinion that the disease was *not* contagious. In Madras, Dr. Scott gave the separate reports he had received, and expressed his own opinion as *doubtful* of its contagious nature. In Bombay, Dr. Kennedy forwarded many extracts of the reports sent to him, which supported his view that cholera *was* contagious. Did they all attach the same meaning to the word, and what was that meaning? It is curious to remark that when cholera first appeared in Europe the general opinion of the medical profession was that it was *not* "contagious."

The meaning which I attach to the word is "communicable," or "transmissible," directly or indirectly, from a person suffering from the disease, to a healthy person, in the same, or in a different locality, inducing similar symptoms, and capable of being re-transmitted. In this sense my experience has proved cholera to be contagious, without leaving a doubt in my own mind.

Another great difficulty in these investigations is, that on the first appearance of an epidemic the symptoms are so obscure, and so imperfectly known, that the signs are overlooked, or ignored, which subsequent observation clearly indicates as induced by the presence of the poison. This is apparent in many of the reports of the present day;—and one instance may be cited, which occurred in the investigation of 1817, above referred to. Dr. Jameson—one of the best of the reporters of this period, quotes, as a proof of the non-contagious nature of cholera, the fact that three medical officers had only suffered from sickness and diarrhœa a few hours after performing a *post-mortem* examination of a brother officer who had died of cholera. Diarrhœa was not then considered a stage of the disease; though this is now an acknowledged fact, and the symptom is carefully watched, and treated as such, by those who have experience in these epidemics.

In all epidemics the most important practical point is, to ascertain the source from which the poison emanated, which, by its presence in the body, induced the symptoms of the specific attack. The channels of transmission, and the means that promote, or restrain its development, require careful investigation in studying the prophylactic treatment, and the knowledge of them is essential to the rational medical treatment of the disease.

It was hoped that the advance in mechanical skill in the present age, in the construction of the microscope, would enable careful observers to trace the presence, and development of any microsms that might have excited the symptoms of the disease; but though several very zealous and intelligent searchers thought they had detected the specific germ of cholera, either as specimens of the animal or vegetable kingdoms, further investigation proved that they were mistaken. I consider this point settled, so far as our present appliances for observation are available, by the experiments carried on by Drs. Lewis and Cunningham under the orders of the Indian Government. They have traced the various supposed specific organisms to numerous independent sources, and found none special to cholera, small-pox, or other epidemic diseases. So far as the most perfect instruments can be employed, with patient enduring application, guided by clear intellect and zeal, and supported by the most liberal encouragement from Government, this investigation has been all that could be desired; and the profession has every reason to accept the result with confidence.

Epidemic diseases run a determinate course, which can rarely be cut short with advantage. In some, as measles, for example checking, or driving in the eruption, is followed by the most dangerous symptoms. Cholera appears to be an exception to this rule, as the arrest of the earlier symptoms of diarrhœa is the safest, if not the only, treatment that can be advantageously employed. Epidemics run a determined course, not only in the individual affected, but also in the locality—and we here encounter another difficulty in collecting correct information as to the dates at which the disease appears in various places. The reports being written some time after the disease has ceased, the uncertainty and conflicting nature of the best evidence is very discouraging. In the onward course of an epidemic, individual villages are often passed untouched; but subsequently the disease affects them, while those previously attacked escape. The duration of the attack is modified, in any town or village, by its size, and sanitary condition, and the season and state of the weather. The more crowded and filthy the town, the more intense and fatal will be the disease; and the more readily is it communicated to the healthy part of the population.

In tracing the course of epidemics in India, it is found that there is a lull in their progress at certain seasons of the year; though they afterwards resume their course. The most probable explanation of this fact, is, that the germs lie dormant in the intermediate period. I saw cholera break out at Agra for four successive years, at nearly the same date, when the interval had been free from it.

It is often difficult to trace the communication of the disease from place to place, by human intercourse, as it is only in the earlier stages of malaise, or diarrhœa, when it would not attract attention, that a person suffering from cholera would have the strength to travel. The disease, very frequently, never passes beyond this stage; or the person may have passed through the place before collapse supervened. The evacuations during the stage of diarrhœa are as capable of disseminating the poison as those in an advanced stage of the disease; and the evil may thus have been communicated, without detection, even under careful investigation, especially if an interval of several days, or weeks, has occurred before inquiry is made.

I was convinced that a correct knowledge of the date of the appearance of the disease, at the different places in its course, during the progress of an epidemic, would be of the greatest value, in the study of this subject. I was in a position to secure the accurate information so desirable, when a severe epidemic broke out at Hurdwar, in 1867. I was at Meerut, in the vicinity of Hurdwar, and received a report of its appearance the day after it broke out. I immediately sent orders to all the medical officers in the Upper Provinces and in the Punjab to report the date of the appearance of the disease at their stations, and its daily progress amongst the pilgrims and the population. There was thus an opportunity of tracing the course of the epidemic from a centre, with a radius of four or five hundred miles, extending in all directions, over mountains, and plains, and rivers; across cultivated lowlands and sandy deserts. The fact that the epidemic spread at a season when the disease is generally absent from that part of the country, was an advantage in sharply defining its course. The observations sent me were made by scientific medical experts and by gentlemen of the civil and military services whose opinions deserve respect, and whose reports may be implicitly relied on. The date of the origin of the epidemic may be taken as that of the great bathing day at Hurdwar, the 13th of April. There were then present upwards of two millions of pilgrims. On that day they commenced returning to their homes, and in three days they had entirely dispersed.

The disease appeared in the villages and towns, east and west, north and south, upon the routes they travelled. There was little difference in its rate of progress on any of the lines, which was that usual to travellers on foot, or in bullock carriages. In no case did it exceed that rate except towards Mooltan, and there the pilgrims were carried the last 200 miles by rail. The disease was carefully traced to the limits of India at Peshawur and subsequently to Cabool, Candahur, and Herat; and from Mooltan and Kurrachee to Persia. The solid chain of observation was here broken, as no records are kept in the semi-barbarous countries of Central Asia or the more civilized states of Persia and Turkey, or it would probably have been traced as the source of the European epidemic of 1870–71.

The dissemination of the disease was thus distinctly traced to the stream of returning pilgrims. It is not probable that each carried the seeds of the disease from Hurdwar; it is more likely that traces of it were left upon the road by the first parties, which affected those who followed in their rear, and who could thus receive and transmit the poison.

The secondary diffusion of the disease from the affected pilgrims, on their return to their homes, was in some instances distinctly traced to intercourse with their neighbours; though in many, the chain of connection could not be discovered. It is not easy to explain the difficulty of such investigations. Facts must be elicited from a crowd of confused narrations, collected in reports, made in answer to circulars; many of these contain untrustworthy information, so that the greatest care is requisite, and some skill necessary, to bring forward the facts in an available form. It may be useful to mention my experience, and a plan I resorted to. In 1868 I carried out an inquiry, under instructions from Government, regarding cholera. I drew out a number of questions on practical points, and requested the administrative officers of all the Presidencies to collect answers from their executive officers, who were required to state the result of their experience. On analysing these returns, I found that their answers could be tabulated under three heads, and their opinions classified, as positive, negative, and doubtful; and the concentrated opinions could be plainly shown in a single line, easily read. These forms were filled up by the medical officers of all the Presidencies, and the opinions of upwards of five hundred (505) of all ranks in India were thus obtained. The accompanying table (Table I.) shows these opinions on the most important points bearing upon the inquiry in an epidemiological point of view. Some have objected to the usefulness of this research, as it merely elicits opinions, and they desire facts from which to form their own opinions; but where ninety-eight per cent. of those referred to concur in opinion on any point, the conclusion may be considered as established, and this was the result with regard to the communicability of cholera.

TABLE I.

(CHOLERA INQUIRY, 1868.)

| | Percentage of correspondents expressing their belief in |
|---|---|
| *The Communicability of the Disease* | 98·0 |
| ,, From person to person | 75·0 |
| ,, From place to place | 85·0 |
| ,, Through the medium of the atmosphere | 80·0 |
| ,, Through the medium of the drinking water | 85·0 |
| ,, Through the medium of the evacuations | 92·0 |
| ,, Through the medium of clothes | 98·0 |
| *The Sanitary Conditions Influencing the Prevalence of the Disease.* | |
| The injurious effects of impure air | 100·0 |
| ,, ,, of defective ventilation | 100·0 |
| ,, ,, of buildings not having raised foundations | 92·0 |
| ,, ,, of overcrowding | 100·0 |
| ,, ,, of malaria | 88·0 |
| ,, ,, of impure water | 98·0 |
| ,, ,, of the admixture of cholera evacuations with the water | 88·0 |
| ,, ,, of public latrines | 70·0 |
| *The Precautionary Measures (other than Sanitary) Advisable.* | |
| The avoidance of fatigue | 100·0 |
| ,, of purgatives | 90·0 |
| The use of quinine | 50·0 |
| Disinfection, in relation to the sick of cholera, and of the evacuations | 98·0 |
| Disinfection of the chamber utensils and bedding | 98·0 |
| ,, of rooms and furniture | 98·0 |
| Isolation of the sick in special hospitals | 98·0 |
| ,, of attendants upon the sick | 95·0 |
| Removal of the healthy from the infected locality | 98·0 |
| ,, ,, ,, into tents | 95·0 |
| ,, ,, ,, across a river | 92·0 |

The knowledge we have gained of the nature of cholera, and its earlier symptoms, has been turned to great practical account by the Government of India. Simple rules are laid down for the prompt removal of troops from cantonments on the first appearance of the disease. Obedience to these rules has resulted in an important saving of life in attacks of this epidemic.

There were difficulties in introducing these regulations in India; the expense is considerable, the trouble to various departments great, and the discomfort to individuals is irksome; but all this is counterbalanced by the acknowledged benefit derived from the measure. These regulations are applicable, with slight modifications, to all epidemic attacks of cholera, plague, typhus, or yellow fever, or small-pox. The sanitary laws are the same in all, the dissemination by human intercourse is analogous, the advantage from the use of disinfectants similar, and the danger from overcrowding, and the benefits to the individual of open space and pure air, are equal.

The channel through which the poison enters and leaves the body differs in the various epidemic diseases. In small-pox and eruptive fevers the skin appears the ordinary channel, and the mucous membrane the most common in cholera; but it is not restricted to these channels. Having entered, the specific disease runs its course with regularity, severely or mildly according to the condition of the body and its surroundings, as seed sown will produce a luxurious and prolific crop, if the soil is rich and prepared for it; while the crop will be scanty and stunted if the soil be barren and unsuitable. The practical distinction between endemic and epidemic diseases is too often ignored, especially in reference to cholera, which is said to be endemic in Bengal; but epidemic in all other parts of the world. This is a mistake, unless small-pox can also be called an endemic disease in Bengal, where it is still more persistent in its appearance than cholera, and where, like cholera, it is, as a general rule, influenced by season, though in exceptional instances intensely severe at unusual seasons.

I consider it equally probable (or true) that there is a specific poison in ague and other endemic diseases as in cholera or small-pox; but with this practical difference, that it cannot be transported in the body of the sick and communicated in a distant locality to a healthy person.

On the arrival of a person suffering from an epidemic disease at a healthy locality, the place itself may become infected, and capable of communicating the disease to individuals. Numerous illustrations of this fact have occurred in India; when healthy regiments have been affected with cholera, after encamping on ground lately occupied by another regiment suffering from that disease. In this manner cities and cantonments may be sources of locally disseminating the disease, in which case cholera is now said by Dr. Bryden to have become "localised."

The water supply forms the most active agent in such instances. According to Professor Pettenkofer's views, the germ of cholera must pass one stage of its existence in the subsoil water; but this theory is inapplicable to cases where the disease appears on board ship; and is not consistent with the manner in which it has spread over the world.

There is greater difficulty in confuting the theory of the aërial diffusion of epidemics. This has existed from time immemorial, and in the case of cholera, has an able advocate in Dr. Bryden. As man cannot exist where there is no air, it is difficult to eliminate this factor in the result. That the disease spreads against the wind, or is carried thousands of miles against it, in steam vessels, and on the passengers landing spreads in the new country, renders the theory of its being conveyed by the wind untenable.

That the air in the immediate vicinity of the sick may transmit the disease is very probable. In my personal experience I regarded this as the channel of communication when I was attacked with preliminary diarrhœa three hours after attending to some cholera cases in the bazaar at Indore, in 1848; and again at Agra, in 1856, when I was attacked with the first symptom of the disease, in the cholera ward of the Central Prison Hospital. Those who have little knowledge of the disease may say that these attacks, and thousands of other cases which do not proceed to collapse, were not cholera, but experience teaches a different lesson.

That epidemic diseases prevail more in some years than in others does not prove that the cause of this is a diseased state of the air any more than that it is a deranged state of electricity or magnetism, which is diffused as universally, or that it depends on the spots in the sun, or on a conjunction of planets, or lunar influence. The mistake of many writers is in limiting the diffusive agency to that which suits their own theory; while it is probable that many causes have a share in modifying the intensity of the epidemic. All agree in allowing the existence of a specific germ, or poison, which acts on the human body, but some question its escaping from it after having developed the specific symptoms. To me this appears to be a natural consequence, and though the entity has not been seen, its action has been traced through the various channels of entrance and exit, to the conviction of nearly all the medical profession, and most certainly to my own.

That every person coming in contact with one suffering from an epidemic disease, as plague, typhus, small-pox, cholera, does not show symptoms of that disease; that hundreds escape without attack, even after constant attendance on the sick, as medical officers, hospital attendants, &c., is fully acknowledged. This immunity has been observed with regard to cholera from its first appearance in India up to the present time; but this only shows that personal contact, though one of the channels of communication, is not the most frequent. Instances, however, are numerous in which contact with the living or dead body of a cholera patient has been the evident source of the disease.

There are some powerful agents whose influence is scarcely appreciated which impede the development of the action of the poison, and so prove a protection from the attack of the disease. The most important of these is vital energy, the *vis medicatrix naturæ* of ancient writers, by which the poison may be eliminated unchanged, or decomposed and digested, and evacuated in the same manner as other poisons of a mineral, vegetable, or putrid nature. This opinion of the benefit derived from the action of the *vis medicatrix naturæ* is confirmed and supported by the fact that all actions or medicines that exhaust or weaken this influence, promote and aggravate the action of the cholera poison. Exhaustion from fatigue, want of rest, or want of food; grief or fear, predispose to the development of the disease. It is to its influence that the disappearance of the malaise and the subsidence of the diarrhœa amongst the troops and prisoners is to be attributed, which immediately follows their removal into camps away from infected localities. I have had opportunities of observing this take place in eight different epidemics, when superintending such removals at Agra, Gwalior, Muttra, and Umballa. The benefit derived from the change into camp is still dwelt upon in the latest sanitary reports from India.

A previous attack of some epidemic diseases has a powerful influence in guarding the body from a subsequent one, or rendering the symptoms milder. This is most marked in eruptive epidemics, as small-pox, measles, &c., and it is generally supposed that some protection is given by a previous attack of plague, typhus, or yellow fever. In cholera a previous attack affords no protection. This was clearly demonstrated by a careful examination of the records of cases in the Central Prison at Agra, during the years 1860, 1861, 1862, 1863, and 1865, when there were five successive epidemics, and those who were attacked in the first and re-admitted the same year, and survived, were exposed to the subsequent outbreaks of the disease. The result shows that the ratio of deaths differs little from that in first exposures, viz., 2·75 per cent. of fresh exposures; 2·23 of re-admissions, the same year; 2·4 per cent. of the second attack; 0·77 per cent. of the third attack; 2·48 per cent. the fourth.

For illustration of the influence of season on epidemic diseases, I have selected, as most characteristic, that part of India which is most regular in the changes of its climate, and is least affected by the proximity of the sea, viz., from Allahabad to Mooltan, an extent of eleven degrees of longitude; and from Gwalior to Peshawur, an extent of nine degrees of latitude; and have contrasted the returns from it with those from Lower Bengal and Madras, on the east coast of India. The returns from Bombay, on the west coast, and in London during the three epidemics of 1849, 1854, 1865, coincide in a remarkable degree with those of the Upper Provinces of India on this point. A similar influence is seen to modify cholera epidemics in Europe and America, but I have not the means of tabulating this so distinctly as from the Indian reports. The returns of cholera among the European troops extend back to 1814, and were extracted by me from the records of the Medical Department in Calcutta up to the year 1858, and from the reports of the Sanitary Commissioner with the Government of India, to 1875. Those of small-pox only extend back to 1864, as there were no returns of the civil population previous to that date. The returns of typhoid fever extend back to 1858; when the disease first appeared in the jail returns. The returns from Peshawur, from which we gain information regarding the influence of season on the endemic disease of ague, at that station, extend back to 1844, when it was first occupied by our troops. The returns from the European troops in Bengal extend over a period of sixty-two years, and show that during the three months of the rainy season, July, August, and September, 75·36, or three-fourths of the deaths from cholera took place; whilst during the three months of the cold season, December, January, and February, only 0·54, or half per cent. took place.

### TABLE II.—A.

*Showing the Distribution of Deaths from Cholera in the different months of the year in the Upper Provinces, India.*

| | | Jan. | Feb. | Mar. | Aprl. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPEAN TROOPS. 62 years, 1814-1875. Totl strength, 937,192. | Deaths from Cholera | 6 | 11 | 76 | 209 | 436 | 604 | 1,125 | 3,005 | 1,453 | 261 | 192 | 25 |
| | Ratio per 10,000 strength | 0·06 | 0·11 | 0·81 | 2·33 | 4·65 | 6·44 | 12·00 | 32·06 | 15·47 | 2·76 | 2·05 | 0·26 |
| | Ratio per 100 total deaths | 0·08 | 0·14 | 1·03 | 2·82 | 5·88 | 8·15 | 15·19 | 40·13 | 19·61 | 3·52 | 2·58 | 0·34 |
| NATIVE TROOPS. — years. 1826-1875. Totl. strength, 2,853,182. | Deaths from Cholera | 45 | 25 | 123 | 216 | 351 | 352 | 426 | 639 | 357 | 201 | 194 | 44 |
| | Ratio per 10,000 strength | 0·16 | 0·08 | 0·43 | 0·44 | 1·23 | 1·23 | 1·49 | 2·24 | 1·25 | 0·71 | 0·68 | 0·15 |
| | Ratio per 100 total deaths | 1·56 | 0·87 | 4·28 | 7·30 | 12·21 | 12·21 | 14·82 | 22·23 | 12·42 | 7·30 | 6·74 | 1·53 |
| NATIVE PRISONERS. — years. 1833-1875. Totl. number, 459,274. | Deaths from Cholera | 10 | 11 | 169 | 242 | 441 | 1,172 | 1,653 | 2,877 | 555 | 176 | 110 | 7 |
| | Ratio per 10,000 strength | 0·21 | 0·23 | 3·68 | 5·27 | 9·60 | 25·52 | 35·99 | 62·64 | 12 08 | 3·83 | 2·39 | 0·15 |
| | Ratio per 100 total deaths | 0·13 | 0·14 | 2·27 | 3·26 | 5·94 | 15·80 | 22·28 | 39·78 | 7·48 | 2·37 | 1·48 | 0·94 |
| NATIVE POPULATION. 7 years. 1869-1875. Tot. populatn. from which records received, 463,336,528. | Deaths from Cholera. | 1·808 | 2·073 | 8·152 | 28·206 | 37·148 | 60·868 | 50·113 | 65·084 | 44·445 | 32·106 | 15·613 | 7·676 |
| | Ratio per 10,000 population. | 0·34 | 0·45 | 1·66 | 5·99 | 6·63 | 13·12 | 10·82 | 14·04 | 9·59 | 6·93 | 3 37 | 1·64 |
| | Ratio per 100 total deaths | 0·44 | 0·51 | 2·10 | 6·96 | 9·16 | 15·01 | 12·36 | 16·05 | 10·94 | 7·92 | 3·87 | 1·89 |

The deaths from small-pox during the three hot months, April, May, and June, are 54·95 per cent., whilst in the three months of

September, October, and November they were only 5·55 per cent. In Lower Bengal and the Madras and Bombay Presidencies, the difference at different seasons is not so distinctly marked. The proximity to the sea modifies the temperature, there are no hot winds, and more rain falls throughout the year.

TABLE II.—B.

*Showing the Distribution of Deaths from Cholera among the European Troops, in the different months of the year, in Lower Bengal, Madras, and Bombay.*

| | | Jan. | Feb. | Mar. | Aprl. | May. | Jun. | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOWER BENGAL. 62 years. 1814-1875. Totl. strength, 221,901. | Deaths from Cholera. | 97 | 172 | 388 | 509 | 474 | 277 | 181 | 253 | 126 | 187 | 270 | 126 |
| | Ratio per cent. tot. deaths. | 3·16 | 5·62 | 12·46 | 16·68 | 14·47 | 9·05 | 5·71 | 8·27 | 4·12 | 5·91 | 8·82 | 4·12 |
| MADRAS. 57 years. 1818-1875. Totl. strength, 208,103. | Deaths from Cholera. | 16 | 33 | 39 | 37 | 71 | 36 | 51 | 40 | 33 | 9 | 8 | 5 |
| | Ratio per cent. tot. deaths. | 4·22 | 8·71 | 10·29 | 9·76 | 18·74 | 9·50 | 12·46 | 10·56 | 8·71 | 2·37 | 2·11 | 1·22 |
| BOMBAY. 18 years, 1858-1875. Totl. strength, 84,404. | Deaths from Cholera. | 3 | 3 | 3 | 4 | 11 | 22 | 26 | 65 | 13 | 3 | 3 | 1 |
| | Ratio per cent, tot. deaths. | 1·91 | 1·91 | 1·91 | 2·55 | 7·00 | 14·01 | 16·56 | 41·40 | 8·28 | 1·91 | 1·91 | 0·64 |

Typhoid fever prevails chiefly in the cold season; from December to April, 64·07 of the deaths from it occur, whilst in the hot season it subsides, and during the rainy season, July, August, and September, only 8·94 per cent. of deaths appear. (See Table III.)

Of aguish fever, the admissions in the three months of September, October, and November, are 56·05 whilst in the three months March, April, and May, only 9·12 take place. (See Table III.)

The tables are valuable in proportion to the period under observation, and the number of persons under notice. The results do not prove that the epidemic disease cannot occur at certain seasons, but that such attacks are rare, and therefore,

## TABLE III.

*Showing the Distribution of Deaths from Small-pox, Typhoid Fever, and Ague in the several months of the year in parts of India.*

### SMALL-POX.

| | | Jan. | Feb. | Mar. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **North-Western Provinces and Punjab.** 1870-1875. Population, 434,538,343. | Deaths from Small-pox. | 26,736 | 30,327 | 54,241 | 84,805 | 113,695 | 87,473 | 50,909 | 24,598 | 11,948 | 8,112 | 9,136 | 18,384 |
| | Ratio per cent. tot. deaths Small-pox. | 5·04 | 5·83 | 10·42 | 16·30 | 21·84 | 16·81 | 9·79 | 4·63 | 2·30 | 1·50 | 1·75 | 3·52 |
| **Lower Bengal.** 1873-1875. Population, 183,391,459. | Deaths from Small-pox. | 1,899 | 2,519 | 3,958 | 4,957 | 4,686 | 3,626 | 2,231 | 1,437 | 775 | 653 | 785 | 1,342 |
| | Ratio per cent. tot. deaths Small-pox. | 6·58 | 8·73 | 13·73 | 17·18 | 16·24 | 12·57 | 7·64 | 4·98 | 2·68 | 2·26 | 2·72 | 4·65 |
| **Madras. Presidency.** 1869-1875. Population, 195,664,555. | Deaths from Small-pox. | 20,107 | 22,627 | 25,469 | 23,382 | 18,703 | 15,596 | 16,275 | 15,778 | 13,181 | 13,406 | 13,726 | 15,834 |
| | Ratio per cent. tot. deaths Small-pox. | 9·40 | 10·58 | 11·81 | 10·93 | 8·73 | 7·29 | 7·61 | 7·10 | 6·16 | 6·27 | 6·41 | 7·41 |
| **Bombay Presidency.** 1871-1875. Population, 77,525,041. | Deaths from Small-pox. | 4,325 | 6,617 | 9,184 | 8,685 | 7,168 | 5,443 | 3,429 | 2,246 | 1,408 | 1,187 | 1,526 | 2,175 |
| | Ratio per cent. tot. deaths Small-pox. | 8·09 | 12·39 | 17·19 | 16·26 | 13·43 | 10·13 | 6·42 | 4·20 | 2·60 | 2·22 | 2·85 | 4·06 |

### TYPHOID FEVER.

| | | Jan. | Feb. | Mar. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Jails, North-Western Provinces and Punjab.** 1859-1875. Population, (?) | Deaths from Typhoid Fever. | 567 | 563 | 804 | 834 | 441 | 173 | 91 | 120 | 231 | 365 | 388 | 489 |
| | Ratio per cent. tot. deaths Typhoid Fever. | 10·17 | 11·29 | 16·07 | 16·73 | 8·85 | 3·47 | 1·82 | 2·42 | 4·73 | 7·32 | 7·78 | 9·81 |

### AGUE.

| | | Jan. | Feb. | Mar. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Punjab.** Native Troops, 1864-1875. Totl. strength, 166,011. | Deaths from Ague. | 6,022 | 4,079 | 3,949 | 4,318 | 5,399 | 6,384 | 6,490 | 11,456 | 21,952 | 30,342 | 23,582 | 10,611 |
| | Ratio per cent. tot. deaths from Ague. | 4·44 | 3·00 | 2·91 | 3·18 | 3·98 | 4·50 | 4·79 | 8·44 | 16·18 | 22·37 | 17·39 | 7·82 |
| **Bengal.** Native Troops, 1864-1875. Totl. strength, 89,926. | Deaths from Ague. | 3,782 | 2·850 | 3,460 | 5,312 | 6,868 | 5,746 | 6,385 | 7,165 | 6,266 | 6,502 | 6,724 | 5,106 |
| | Ratio per cent. tot. deaths from Ague. | 5·70 | 4·29 | 5·21 | 8·01 | 10·35 | 8·66 | 9·62 | 10·80 | 9·44 | 9·80 | 10·13 | 7·66 |

though season exercises very considerable influence, it alone does not regulate the disease.

The seasons for the prevalence of various epidemic diseases generally differ, so that a combination of two in the same person is rare. Typhoid fever with small-pox is occasionally found, producing black small-pox. It is more rarely seen with measles and other eruptive diseases. The most important combination in India is of cholera with malarious fever, which indicates an important modification of the treatment. I observed this combination at Mhow, in 1839, and called it the "Malwah sweating sickness." I have received reports of its occasional appearance in all parts of India, more especially in the Punjab, where it was sometimes doubtful under which heading to class the case. The combination of miasmatic with typhoid fever has been very general of late years in Burdwan and in the vicinity of Calcutta. A similar combination with plague has been very marked in the valley of the Euphrates, where Dr. Beck proposes to call it "*Febris intermittens bubonica.*" The combination of miasmatic fever with dysentery is very frequent and fatal during the rainy season in India. The profuse discharge of watery blood in this case gave rise to the name of *bloody flux.* The successful treatment here is counter-indidicated in simple dysentery.

*Famine* and *pestilence* are connected by popular prejudice in the present day, as they have been in the most ancient records of history. India affords a wide field for observation on this point, from the frequency with which famine has desolated its provinces. The absence of statistical information regarding the civil population up to a recent date is much to be regretted in prosecuting this inquiry. The effect of famine does not appear in the military returns, but there is a slight indication of its effects in the jail returns, in an increased mortality amongst the prisoners in famine years, which arises from inanition caused by insufficient or bad food, low fever, or bowel complaint of individual origin. The epidemic disease, cholera, does not appear to be aggravated by famine. In fact it was much less fatal in 1874 in those districts in Bengal which suffered most severely from the famine than in the previous and two subsequent years. There were only 1,066 deaths in that year in those districts, whilst there were 7,528 in 1873, and 5,539 in 1875, and 5,601 in 1876. As a general rule cholera is not severe when the rain is scanty. There was a slight increase of small-pox in that year in the whole province, viz., 12,056 in 1874, compared with 11,502 in 1873; but the total mortality from all diseases in 1874 was 504,980, whilst in the preceding year it was 492,740, and in the following year 600,062, whilst last year, when there was no report of famine the mortality was 993,400, or nearly double that of the famine year. More complete information will be furnished of the effects of the famine during the present year in Madras, by the Sanitary Commissioner, Dr. Cornish, who is one of the most intelligent officers in the Indian service.

*Disinfectants* are useful auxiliaries in restraining the dissemination of epidemic diseases, particularly when directly applied to the channels through which the disease is transmitted; as, for example, to the evacuations from the bowels, to the clothing and the bedding; but they cannot be administered internally to the sick in sufficient strength to destroy the poison, without injury to the patient. The disagreeable odour of some disinfectants should be avoided in sick rooms.

*Isolation* of the sick is a valuable means of restraining the communication of epidemic diseases. Perfect isolation is impracticable; but treatment in special localities, where the sanitary arrangements are complete and the means of disinfection available, is more likely to restrain the disease than allowing it to run its course in the ordinary home or lodging of travellers.

In all systems of *quarantine* the benefit to the sick should be considered, as well as the danger to the community. One affected with disease is much more likely to recover if conveyed to a place where he would be provided with medical attendance, and all necessary comforts, when landing from a ship at any port, than if allowed to go his own way, to any crowded or filthy lane he may desire to reside in. When convenient and well-arranged localities are not provided, and sanitary measures are imperfectly carried out, complaints are justly raised of the inconvenience of quarantine regulations in many countries.

The real difficulty in regulating restrictive arrangements lies in the obscurity of the dormant period of epidemic disease. While we are unable to penetrate this, we should gain one great step by enforcing the isolation of those in whom the symptoms are declared. Theoretically we should be wrong in overlooking the probable existence of disease in others, but practically, the advantage gained by restraining the dissemination of existing disease would be very great.

Perfect security to any country from the invasion of disease is unattainable; but comparative safety might be ensured, and combined with benefit to the sick themselves. This plan is applicable everywhere, and should not, in any case, be neglected, as if the disease is admitted by one line of route, precautions on all others are rendered unavailing.

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